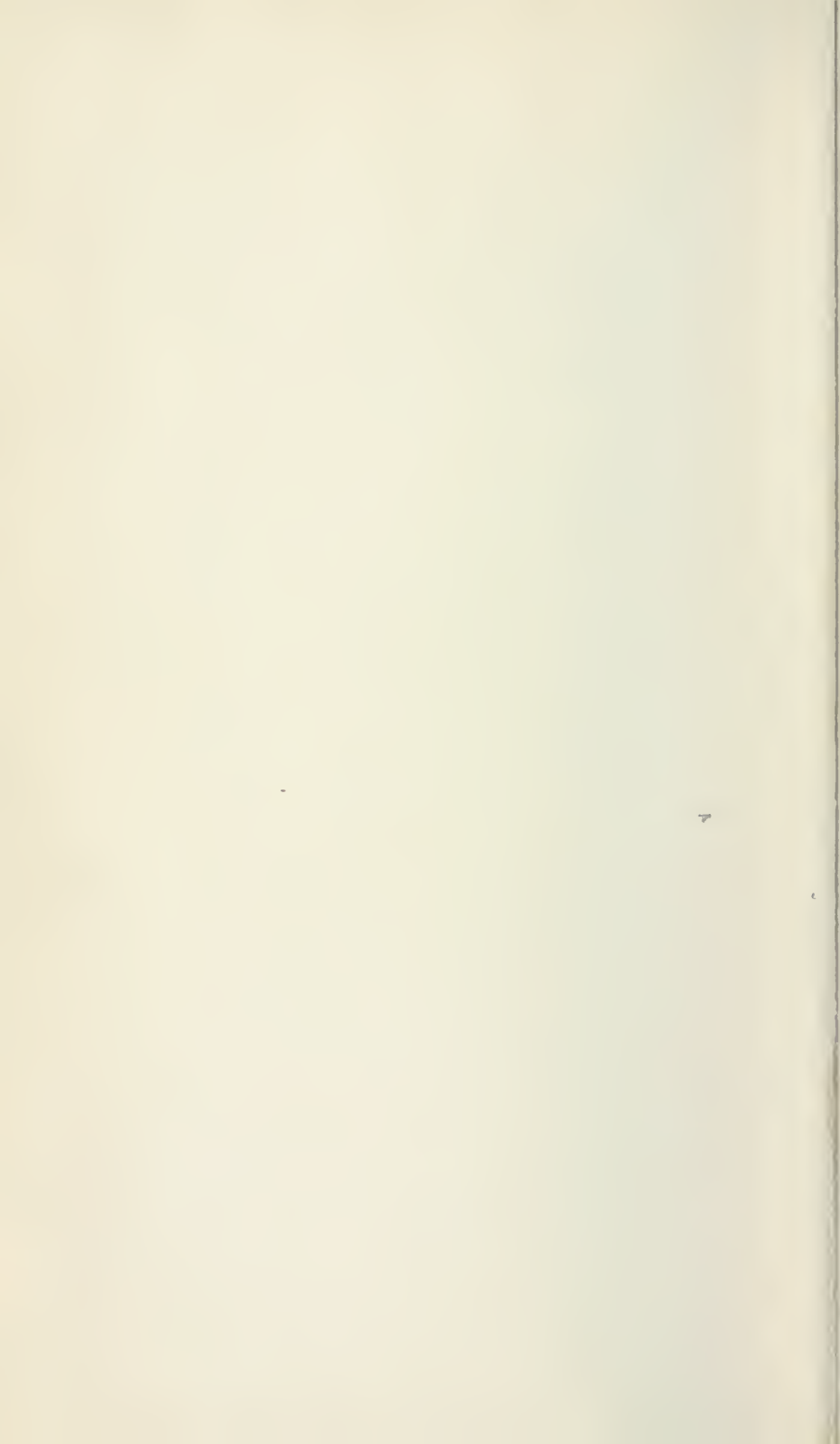








For Constipation, Gout & Rheumatism,
Liver Complaints, Obesity, &c.,

PRESCRIBE

Hunyadi János

**THE BEST NATURAL
APERIENT WATER.**

Directions for Use.

Dose.—To relieve constipation the average dose for an adult is from a third to half a tumbler, taken on an empty stomach on rising. To obtain the depurative and tonic effects in dyspepsia, biliousness, congestion of the liver, &c., a quarter of a tumbler should be taken every morning before breakfast.

"Hunyadi János" may be taken pure or mixed with hot or cold water. If hot water be used the temperature should be high enough to make the mixture as hot as can be drunk comfortably. If cold, the water should be at the ordinary temperature, that is to say, not iced or ice-cold.

A draught of pure water, hot or cold, taken immediately after, increases the efficacy of the laxative and obviates any after-taste.

For Children.—The dose is proportional to the age. Between 5 and 10 years of age from one to two teaspoonfuls of the water, which may be mixed with milk, will be sufficient. Above 12 the dose is a quarter of a tumbler, taken as above.

N.B.—When administered to persons in bed, somewhat larger doses are required to produce the same effect.



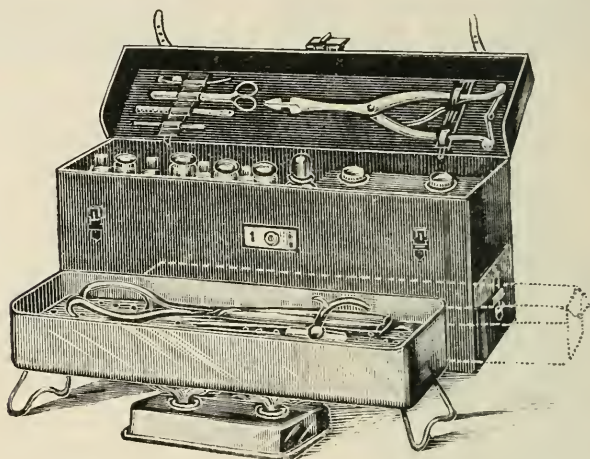
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ANDREAS SAXLEHNER, BUDAPEST.

LONDON Agency: Trafalgar Buildings, Charing Cross, W.C.

Modern
and
Improved

MIDWIFERY BAG WITH STERILIZER.



The bag is made of solid leather having a compartment beneath into which the Sterilizer fits.

The Sterilizer has no seams, being blocked out in one piece from a solid metal sheet and heavily nickel plated.

The larger instruments are carried in Sterilizer, the top portion being reserved for Nail Brush, Lamp, Chloroform Bottle, Pill and Medicine Bottles, Dredger, leaving room for Apron, Gloves, &c.

The inside Cover has loops arranged for carrying the smaller instruments.

PRICE of the Bag, together with Sterilizer, Lamp, Nail Brush in plated case, Minim measure in case, Chloroform Bottle in plated case, Dredger, 3 Pill Bottles, 3 Medicine Bottles.

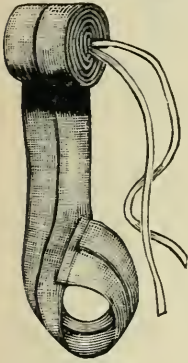
£3 3 0 net (with outside Canvas Cover **4/6** extra.)

R. SUMNER & CO., Ltd.,

SURGICAL INSTRUMENT MAKERS, LIVERPOOL.

THE "PUTTEE" LEG BANDAGE

FOR VARICOSE VEINS, etc.



THESE are Elastic Bandages fitted with a loop for the foot, and tapes for tying.



The advantage is that the bandage is always retained in position.



They are preferable to an Elastic Stocking as they can be adjusted to any required pressure, and are cooler and lighter in weight.

They require no measurements or fitting, and are very much cheaper.

WE MAKE IN TWO SIZES.

To reach the Knee (9 feet by $2\frac{1}{2}$ inches), 2/- each.

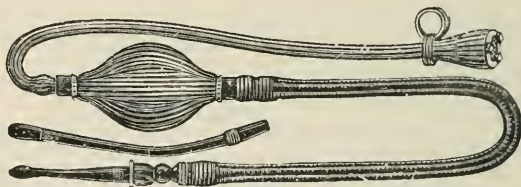
To reach the Thigh ($13\frac{1}{2}$ feet by $2\frac{1}{2}$ inches), 3/- each.

SPECIAL SIZES MADE TO ORDER.

R. SUMNER & CO., LTD., LIVERPOOL.

The "SUMNA"

Continuous-Flow Syringe



THE great and important feature of this Syringe is that it throws a **continuous stream of fluid**, and therefore supersedes all other syringes which are **intermittent** and invariably inject air which is impossible with the "SUMNA."

It requires less than half the exertion to work the "SUMNA" than it does the ordinary elastic bulb syringe, and as the **flow is continuous**, it prevents the return of fecalised fluids, etc., back into the syringe, which frequently happens with ordinary syringes, and is necessarily a source of great danger.

The "SUMNA" is made of the **Purest Sheet India-Rubber**, and far out-lasts ordinary manufactures (which are moulded), and it is therefore considerably cheaper in the end.

The sinker being covered with rubber, it does not cause the clinking so objectionable in syringes with metal sinkers.

The pipes or fittings are made of highly-polished Vulcanite.

The price of the Instrument, with Vaginal and Rectum Pipes, in case, is **6/6**

We, however, make the following additional fittings, all of which will be found **useful** to medical men, and which, together, make a most complete instrument; but any of the fittings are supplied separately.



Tube for Eye, forming Douche,
Price 1/- each.



Tube for Nose and Ear,
forming Douche,
Price 9d. each.



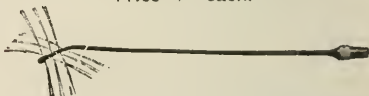
Junction for fitting
Stopcock of
Barnes' Bags.
Price 6d. each.



Thick Uterine Tube, with groove for back flow.
Price 2/- each.



Harrison Irrigator for the Urethra.
Price 1/6 each.



Thin Uterine Stem. Price 1/6 each.

PRICE of SYRINGE, complete with all Fittings, in case, 12/6

R. SUMNER & CO., Ltd.

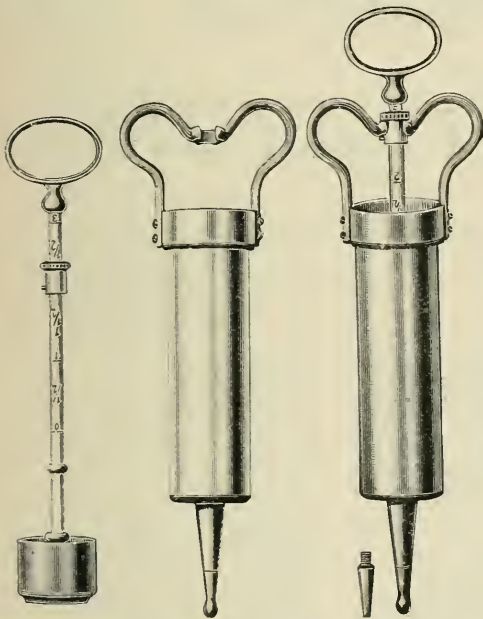
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EAR and WOUND SYRINGE

WITH CONICAL
BULBOUS NOZZLES.



This Syringe is made entirely of Metal. The piston is retained in position by a bayonet-catch mount, and can be easily removed for cleaning and sterilizing. The Plunger is most accurately ground to the barrel.

The finger rings make an excellent grip for operator.



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A useful and ready method of keeping Solutions
... for treatment of Ophthalmic Affections. ...



It consists of four flasks of assorted colours for Solutions, labelled ATROPINE, ESERINE, COCAINE and HOMATROPINE, fitted into a suitable Stand. Each Flask has a Pipette Stopper.

There is also supplied a Tripod and Spirit Lamp for heating and sterilizing the Solutions,

PRICE COMPLETE, 86.

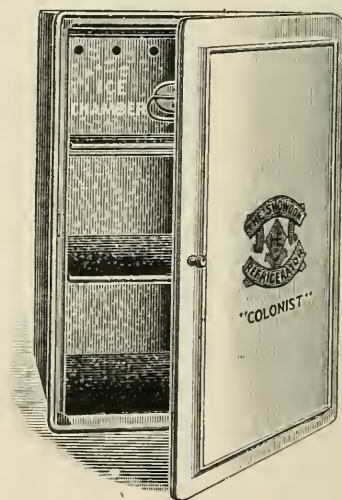
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The "Colonist" Refrigerator.

A light, cheap, well-made ICE CABINET, well adapted for Home and Colonies.

An ideal Safe for keeping Invalids' Foods in during the hot weather. As efficient as the more expensive kinds, and certainly not as cumbersome.

WELL FINISHED
IN
WHITE ENAMEL.



WELL FINISHED
IN
WHITE ENAMEL.

The walls are packed with a non-conductive material, by a patent process.

The chest for the Ice is furnished with a Tap, so that as it melts the water can be removed.

The ventilation is good, and it can easily be kept clean, as all the interior fittings are removable.

Made in three sizes :

No. 1.—Price 25/-	20 inches high, 13 inches wide, 14 inches deep.
No. 2. „ 30/-	22½ „ 15½ „ 16½ „
No. 3. „ 40/-	25 „ 18 „ 19 „

The largest size is recommended as a good domestic Refrigerator, suitable for a Cottage Hospital or Nursing Home.

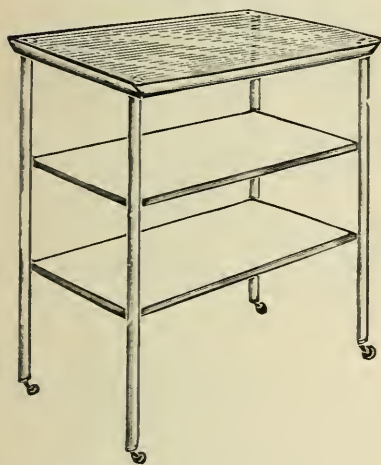
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SUITABLE FOR CONSULTING ROOMS AND
SURGERIES, AT MODERATE PRICES.

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Measurements—

25 × 15 × 36 ins.

Hollow Tubular Legs,

Glass Top,

2 White Enamelled Shelves.



Without Castors - - - **37/-** each.

With „ - - - **40/-** „

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LIVERPOOL.

SUMNER'S

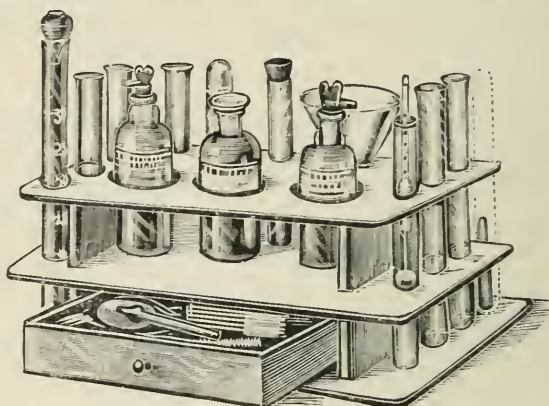
New URINARY TEST STAND

PRICE

10/6

EACH

NET.



PRICE

10/6

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NET.

MESSRS. SUMNER & CO. are particularly desirous of calling the attention of medical gentlemen to their new **URINARY TEST STAND**. This handy little Stand has been specially designed with the view of placing a complete set of Urinary Testing Apparatus, with Solutions, in the hands of medical men at an extraordinary low price. We offer it as being equal in every way to the more elaborate stands hitherto designed. Not only is it complete, but the different articles are so arranged as to take up a minimum amount of space, and, consequently, the Stand measures only 10½-ins. by 5½-ins. It is well and substantially made, and is really of good appearance, quite an ornament to a consulting room table. The contents are as follows:—

Urinometer
Albuminometer
Spirit Lamp
Drop Pipette with India
Rubber Suction Ball
Graduated C.C. Tube
Test Tubes

2 oz. Stoppered Bottle of
Nitric Acid
2 oz. Drop Bottle of Roberts'
Test Solution for Sugar
2 oz. Drop Bottle containing
Esbach's Test Solution
for Albumen

Funnel
Test Tube Brushes
Packet each Red and Blue
Litmus Paper
Packets of Filter Paper
Watch Glass
Graduated Pipettes

From the above it will be seen that, although offered at such a singularly cheap price, it is both compact and useful, and we may say without fear of contradiction, that a Stand of such exceptional value has never before been offered at the price.

It is admirably adapted for use in Hospital Wards.

R. SUMNER & CO., Ltd., 50a, Lord Street, LIVERPOOL.

APPLICATION OF OINTMENTS TO INTERNAL CAVITIES BY THE AID OF COLLAPSIBLE TUBES.

This method of treatment having become largely adopted, we present to the Medical profession a series of Ointments which have been thoroughly tested in the diseases indicated.

For the Urethra two kinds of Catheters are recommended:—

For GONORRŒA and URETHRITIS.

1st.—For recent cases. A Stiff Vulcanite Catheter (Fig. 1) is preferred (with this instrument we supply three Catheters, and it is advisable that the largest that can be passed without pain be used).



Fig. 1.

For GLEET and Long-standing Cases of GONORRŒA.

2nd.—A 9-in. "flexible" Catheter, and is intended for diseases far down the Urethra. Either of the above Catheters are supplied with Ointment Tubes containing the following medicaments:—

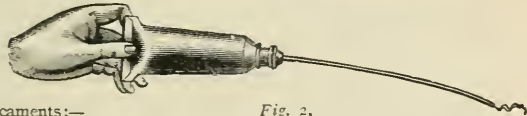


Fig. 2.

- | | | |
|--|--------------------------|---|
| 1. Iodoform & Eucalyptus | 6. Dermatol | 12. Permanganate of Zinc |
| 2. Do. do. and Cocaine | 7. Aristol | 13. Resorcin, Hydrastin & Extract of Belladonna |
| 3. Thallin | 8. Binioidide of Mercury | 14. Loretin |
| 4. Do. and Cocaine | 9. Hydrastin | 15. Protargol |
| 5. Iodoform, Eucalyptus & Perchloride of Mercury | 10. Iodol and Eucalyptus | |
| | 11. Sulphate of Zinc | |

Price complete, 5/- each; with Cocaine, 6/- each.
Ointment Tubes without Catheters, 1/6 each; with Cocaine, 2/6 each; by post, 3d. extra.

In ordering please specify number of the Ointment Tubes, and also whether the Stiff Vulcanite Catheters or the Long Flexible Stem is required.

For DISEASES of the RECTUM.

Each Collapsible Tube is fitted with a specially designed Vulcanite Pipe.



Fig. 3

WE PREPARE THE FOLLOWING OINTMENTS:

- | | | |
|-----------------------------|--|------------------------------------|
| 1. Boric Acid and Glycerine | 6. Ung. Conii | 10. Oxide of Zinc and Boric Acid |
| 2. Cocaine and Morphia | 7. Ung. Belladonna | 11. Perchloride of Iron |
| 3. Ung. Gallæ c. Opio | 8. Chrysarobin, Iodoform, and Belladonna | 12. Acetate of Lead and Belladonna |
| 4. Hamamelis | 9. Gallic Acid and Belladonna | 13. Pilewort Ointment |
| 5. Do. and Cocaine | | |

All the above Tubes complete with Pipe, 1/6 each, with the exception of those containing Cocaine and Conium, which are 2/6 each. By post, 3d. extra.

For DISEASES of the UTERUS.



The Vulcanite Stem and Ointments have been made at the suggestion of Dr. DUKE, Cheltenham.

- | | | |
|--------------------------|-------------------------------|--|
| 1. Antiseptic (Iodoform) | 3. Astrigent (Tannic Acid) | 5. Anodyne (Cocaine and Morphia), useful in Cancer |
| 2. Do. (Boric Acid) | 4. Escharotic (Chlr. of Zinc) | |

Price of Stem, with Ointment Tube of either Nos. 1, 2, 3 or 4 .. each 5s.
No. 5 " 6s.
Spare " Collapsible Tubes of Ointment, Nos. 1, 2, 3 and 4 " 2s.
" " " No. 5 " 3s.
By Post 3d. EXTRA.

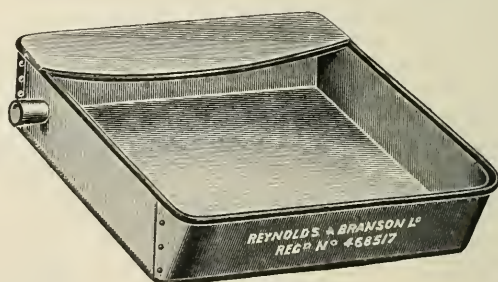
N.B.—We will be pleased to supply Tubes filled according to physicians' own formulæ.

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ADVANTAGES.

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2. EASILY CLEANED, ALL CORNERS BEING ROUNDED.
3. LIGHT.
4. DURABLE.

Measures 13 in. $\times$ 11 $\frac{1}{4}$ in. $\times$ 3 in. deep. Made of Enamelled Iron.

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With COD LIVER OIL.



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“Patients unable to tolerate the purest and most carefully prepared Cod Liver Oil can readily digest and assimilate it when combined with ‘Maltine.’” —*British Medical Journal*.

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By Royal Warrant to His Majesty the King.

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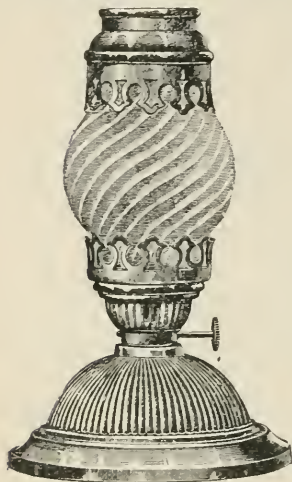
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Per Bottle, 5 gr., 1s. 6d. post free.

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Blood making " Iron
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Acid Phosphates
Aromatics, Sherry Wine, &c.

Sig. Tablespoonful to be taken before meals.

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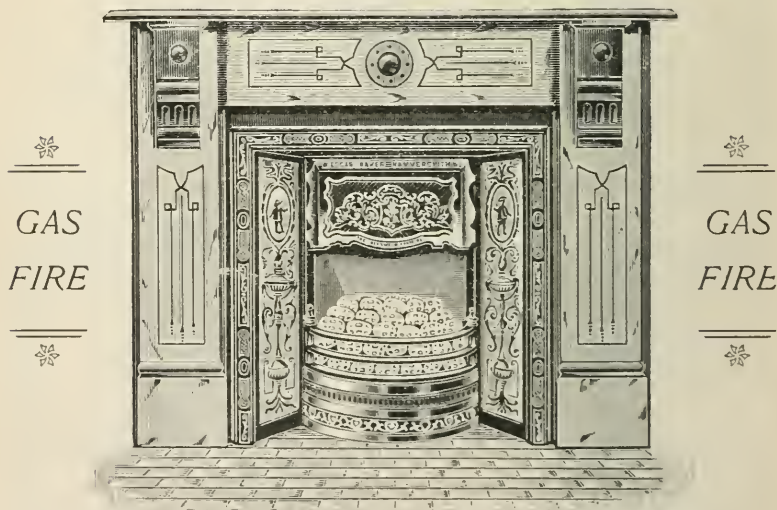
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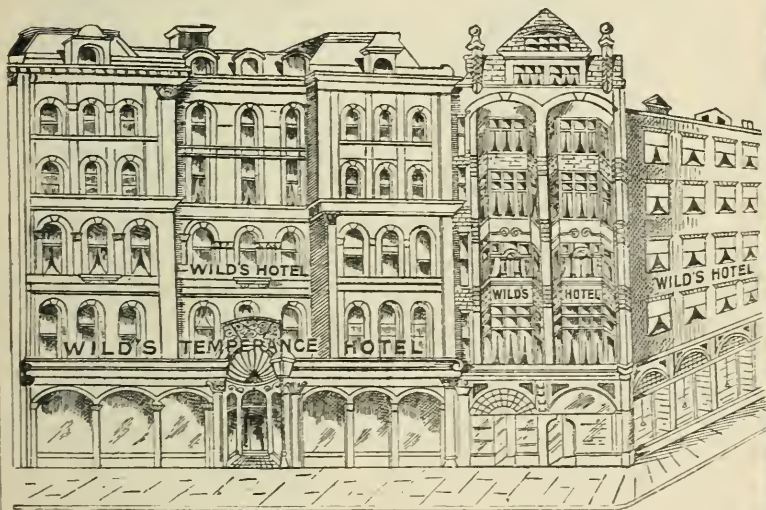
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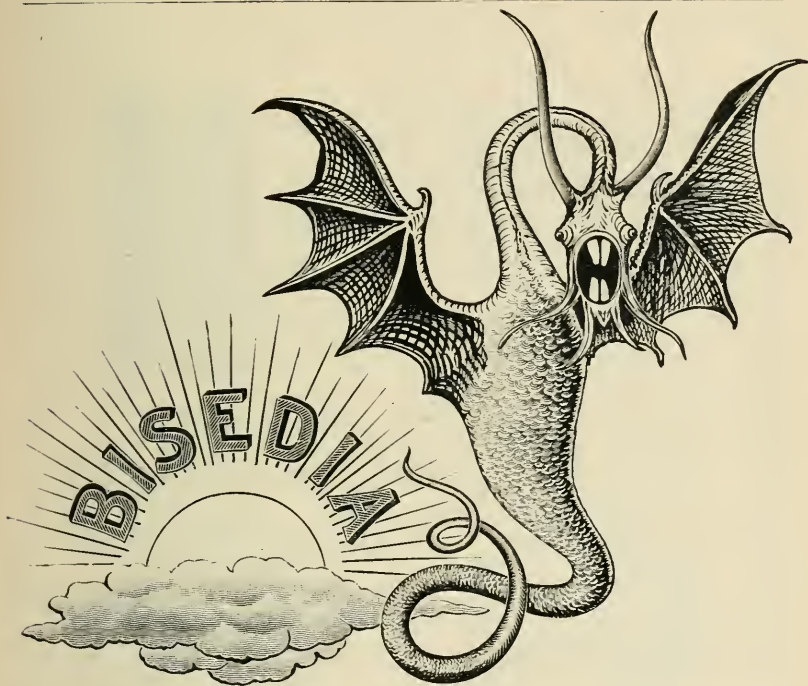
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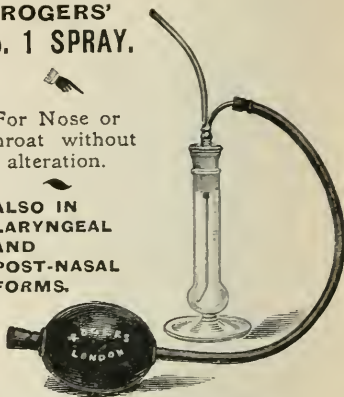
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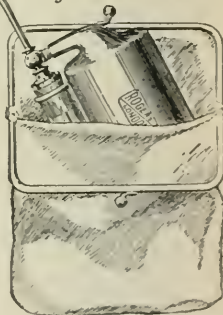


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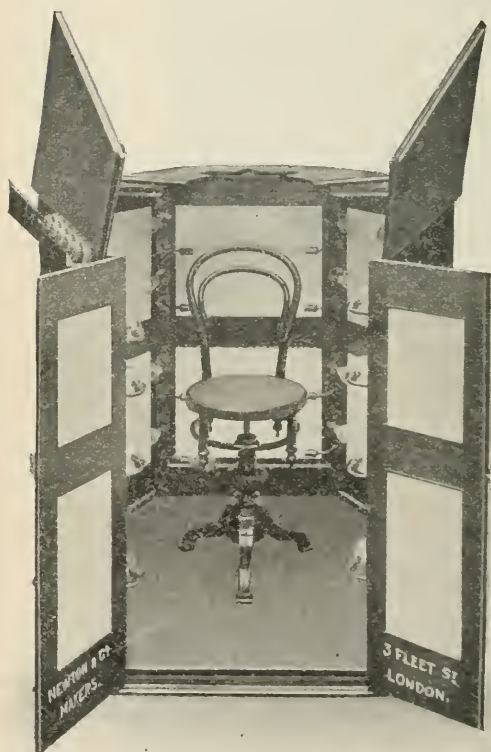
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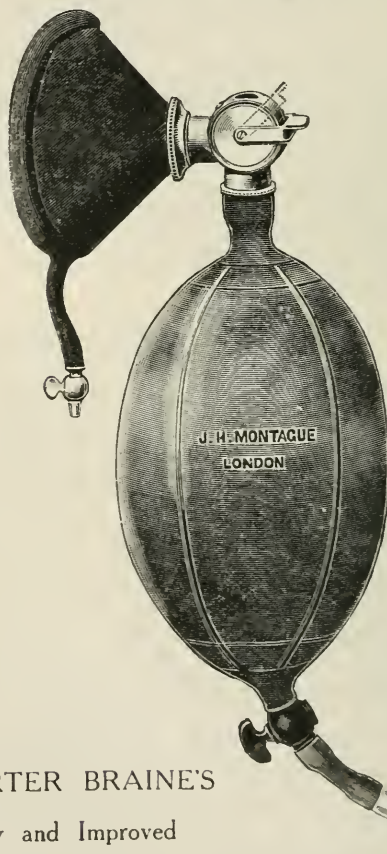
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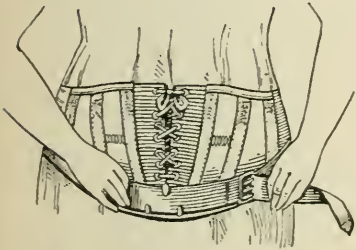
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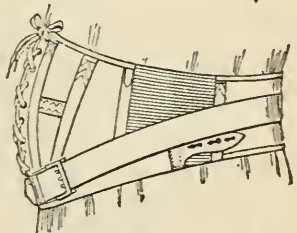
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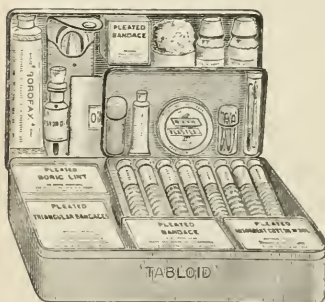
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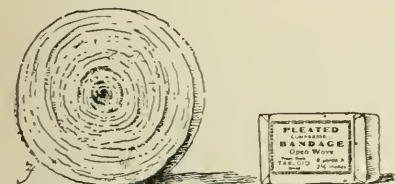
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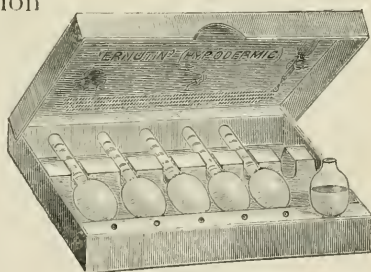
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THE
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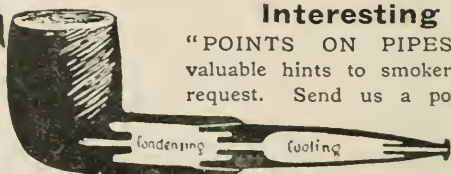
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PREFACE.

MANY of the articles in this volume bear evidence of the revolution which is taking place in medical thought. Starting with a clearer knowledge of the functions of the blood in health and disease, we find new clinical methods and new criteria of therapeutic action forced upon us. We speak of disease in a new language, embodying more advanced and philosophic thought.

The "vis medicatrix naturæ" appears to us in a new light. Nature unassisted makes a poor fight; the work of the physician is to help the vital force to resist disease, instead of trying to batter down the "symptoms" which represent its struggles.

The present is a period when the practitioner who is not abreast of modern thought will find himself a hopeless straggler in the rear.

In this volume we have tried to bring our readers up to date in the advances made in all departments of medicine and surgery, and to make the volume a book to read, as well as to refer to. If there be something more we might have done to fully satisfy our readers, it would be kind to complain, because the whole staff of the *Annual* are anxious to give their best, and the next edition always affords the opportunity for improvement.

THE EDITOR.

*The "Medical Annual" Offices,
Bristol, February, 1907.*

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THE MEDICAL ANNUAL.

Part 1.—The Dictionary of Materia Medica and Therapeutics.

REVIEW OF THERAPEUTIC PROGRESS, 1906,

BY

FRANK J. CHARTERIS, M.B., CH.B.,

*Assistant to Professor of Materia Medica and Therapeutics, Glasgow University;
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GENERAL REVIEW.

THE possibility of producing synthetic drugs which will prove more advantageous than cocaine as local anæsthetics, has attracted some attention during the past year. Three drugs have been extensively tried, viz., Novocaine, Alypin, and Stovaine. For each one certain advantages are claimed. Judging from the published reports, these new drugs seem reasonably safe, though it is questionable whether any of them constitutes any real advance on cocaine. The great advantage of using an old-established drug is that all its possible bad effects are known already, while the newer ones may at any moment give rise to some hitherto unnoted effect. Both novocaine and stovaine have been extensively used in producing spinal anæsthesia. No method of inducing anæsthesia is absolutely safe, and certainly the injection of drugs into the subarachnoid space is not free from risk. Some of the unpleasant results, such as one-sided anæsthesia, may be put down to faulty technique, but other mishaps are totally unexpected and cannot be foreseen. Cases of paralysis of certain muscles of the eye have been reported in sufficient number to prove that this accident is by no means uncommon after spinal anæsthesia, though it is extremely difficult to explain.

It is possible that the interesting investigations of Meltzer and Auer on the inhibitory action of Magnesium salts may prove of lasting value. Meanwhile trial has been made in too limited a number of cases to permit of a definite expression of opinion, but if the claim is established that after the spinal injection of small quantities of a soluble magnesium salt into the spinal canal, the spasms of tetanus are prevented for several hours, a distinct therapeutic advance will have been made.

Of the newer drugs which have been introduced, the most important seems to be Alynin.

In Serum-therapy the most striking feature has been the increased use of the opsonic index for checking the therapeutic effect of treatment in phthisis, but the method is yet much too complex for the use of the general practitioner. Apart from the treatment of diphtheria, serum-therapy has proved rather unsatisfactory, and on the whole the results obtained in other diseases have been disappointing. Possibly the explanation may lie in Wright's suggestion that many of the so-called antitoxic sera contain unaltered toxin, and act as vaccines rather than antitoxic sera, and as such require different rules for their proper use.

In Organo-therapy no advance of any importance has been made.

DICTIONARY OF REMEDIES.

ADRENALIN.

Rhodes¹ has tried the injection of adrenalin into **Malignant Tumours of the Nasopharynx**. He injects into the substance of the tumour 5-10 minims of the following solution :

R	Adrenal. Hydroch.	gram 0.12	Chloretone	gram 0.025
	Boric Acid	gram 0.6	Distilled water	grams 15

The result is immediate shrinking of the tumour, with temporary alleviation of pain.

Kreuzfuchs² recommends the internal administration of adrenalin for diseases which are associated with hyperæmia. He found, in a case of angioparalytic **Megrim**, when all other treatment failed, immediate benefit from a pill containing $\frac{1}{4}$ mgm. adrenalin. This pill acted well in dyspeptic conditions, probably by rendering the gastric mucous membrane anæmic.

Barclay³ found the injection of 5 minims of adrenalin solution 1-1000 of use in a severe case of **Tachycardia** occurring in exophthalmic goitre. Under the continued use of the drug the disease was cured.

Josué⁴ finds that the lower animals are less susceptible to adrenalin than human beings. Thus a rabbit can withstand four times the amount which causes discomfort in a man. In his opinion, one should not inject more than $\frac{1}{120}$ gr., and even this amount only in exceptional circumstances. Though less toxic when given by the mouth, the same dose limit should be used. In whatever way administered, the drug should not be given for more than six days at a time, because of the risk of setting up cardiac or arterial disturbance.

Marvel⁵, discussing the application of adrenalin to the peritoneum, points out that, diluted with warm saline solution, adrenalin may be used to counteract **Shock** in abdominal operations. Further, he finds it useful for controlling the bleeding which results from separating adhesions, and as a prophylactic measure in **Acute Peritonitis**, to prevent the formation of adhesions. For this purpose he dilutes 1 fl. dr. of adrenalin solution with 1 or 2 pints of warm saline, and

leaves this free in the abdomen in cases where there is acute inflammation with exudate, or where raw surfaces are present.

Mason⁶ found the injection of adrenalin in a case of **Enteritis** in a child of $1\frac{1}{2}$ years of great service after other remedies had proved useless. The drug was injected immediately after the passage of a stool. The dose was 5 minims of 1-1000 solution. The application was repeated in three hours, and as the result, the stools became very much less frequent and ceased to contain blood.

Ravogli⁷ employs this drug in **Acne Rosacea**, in **Nævus Vascularis**, and in **Telangiectasis**. The skin is cleansed with a 2 per cent solution of carbolic acid, and then the vessels are cut through. After the blood has flowed for a short time, the skin is again cleansed with the antiseptic, and covered with a piece of lint saturated with adrenalin solution for five minutes.

Berry⁸ has performed a series of experiments on guinea-pigs to determine the exact action of adrenalin chloride on toxic doses of cocaine. There are different views held regarding this point, some holding that it protects the animal, and others that the exact opposite is true. Berry's own experiments, carried out with intraperitoneal injections, support the latter view. Using large doses of cocaine, he finds that adrenalin does not protect the animal against the ordinary toxic dose. It is, therefore, very important, when using the usual adrenalin-cocaine mixtures, to avoid approaching the toxic dose of cocaine, as adrenalin not only failed to afford any protection against the toxic effect, but even seemed to intensify it. Sikemeier⁹ comes to the same conclusion.

Hedinger¹⁰ has investigated the changes which take place in the vessels after the subcutaneous use of hæmostasin or intravenous application of adrenalin. The changes are confined to the aorta, and consist of a localized necrosis and calcification of the muscular elements of the media, along with more or less damage to the elastic fibres. The condition is essentially a meso-aortitis, and by the strict limitation to the media differs from the arteriosclerosis of man. Hedinger is inclined to think that the changes are produced as the result of a combination of heightened tension and direct toxic action on the muscle-fibres. The production of such changes after the subcutaneous use of suprarenal preparation is a new observation, and indicates the need of caution in employing subcutaneous injections.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* Aug. 11 1906; ²*Wien. med. Presse*, 1906, No. 17; ³*Amer. Pract.* July 1906; ⁴*Sem. Méd.* 1906, No. 1; ⁵*Ther. Gaz.* July 4, 1906; ⁶*Rich. Jour. of Practice*, June, 1905; ⁷*Lancet, Clinic*, Feb. 17, 1906; ⁸*Amer. Jour. Med. Sci.* Nov. 1905; ⁹*Arch. f. klin. Chir.* Bd. lxxvii. Hft. 2; ¹⁰*Cor.-Blatt. f. Schweiz. Aerzte*, Oct. 15, 1905.

ALCOHOL.

In obstinate cases of **Facial Neuralgia** Ostwalt¹ injects down upon the trunk of each branch of the nerve affected, from 1-1½ cc. of 80 per cent alcohol, to which a little stovaine or cocaine is added, and obtains good results.

Clarke and Brown², from experimental and clinical study, conclude that alcohol has a local antidotal action to carbolic acid burns owing to its solvent power, but there is no chemical antagonism between the two substances, and thus alcohol produces no antagonistic action after the phenol is absorbed into the system. So long as phenol remains in the stomach, lavage with alcohol is effective, but presents no marked superiority over lavage with water. They recommend, in poisoning cases, immediate abundant lavage of the stomach with 10 per cent alcohol, followed by lavage with plain water.

Friedenwald³ gives the results of a long series of observations on the pathological effects produced in rabbits by the prolonged administration of alcohol. There was a marked difference in the susceptibility shown by different animals. Some died after a few doses; others lived for years. Alcohol reduces the hæmoglobin and the gastric free hydrochloric acid. The most marked pathological changes were fatty degeneration of the heart muscle, and of the liver and kidneys. No case of genuine hepatic cirrhosis was noted. In the brain there was quite marked atrophy of the cortical cells.

Wood and Hoyt⁴ have studied the action of alcohol upon the circulation of the dog. They find that in the normal dog alcohol has little, if any, action in increasing blood-pressure. The same holds true in dogs suffering from infectious fever; but if the cervical cord be severed and artificial respiration maintained, then alcohol distinctly and consistently increases the arterial pressure. Alcohol markedly increases the rate of flow of the blood through the large arteries, independent of any rise of blood-pressure. The authors conclude that alcohol simultaneously stimulates the heart and depresses the vasomotor centre, thereby widening the blood channels. The inconsistency of the effect of alcohol arises from the fact that either of these two actions may predominate.

REFERENCES.—¹*Presse Méd.* Dec. 16, 1905; ²*Jour. Amer. Med. Assoc.* Mar. 17, 1906; ³*Ibid.* Sept. 9, 1905; ⁴*Mem. Nat. Acad. Sci. Philad.* Vol. x. 1905.]

ALPHANAPHTHOLPHTHALEIN.

Lemoine and Caudron¹ find that this substance is a **Purgative**, which, they claim, is free from toxic action. It is a greyish-green powder, insoluble in water, and without any taste or characteristic odour. The laxative effect is comparatively rapidly produced: as a rule within three or four hours in men, and rather more rapidly in women. The stools are semi-liquid, without offensive smell, and the drug does not cause pain or colic. It seems, in addition to acting as a laxative, to exert some antiseptic effect on the contents of the gastro-intestinal tract.

REFERENCE.—¹*Nord Méd.* Feb. 15, 1906.

ALYPIN.

This **Local Anæsthetic** has been extensively tried, and has met with very general approval. It is preferred to cocaine by several writers. It is a soluble salt, which is not decomposed by heat, and therefore

can be sterilized by boiling. The solutions are neutral, but the addition of a small quantity of alkali does not cause a precipitate. Its action upon the eye has been carefully studied. Instillations of 2-3 per cent cause smarting, but this rapidly gives place to anæsthesia of the conjunctiva. Unlike cocaine, it causes some vasodilatation. There is no increase in intra-ocular tension, and only slight mydriasis. The secondary effects are less marked. The accommodation is not disturbed, and there is very slight subsequent shedding of the corneal epithelium.

Fischer¹ finds it very useful for rendering painless the extraction of foreign bodies from the eye. Its action is prompter than that of cocaine, and in his experience with some 170 cases, no instance of unpleasant after-effect was noted.

Ohm² has also used this drug extensively in **Ophthalmic Work**. He finds 2-3 per cent solutions satisfactory for extracting foreign bodies. For strabismus operations he employs the subconjunctival injection of 0.05 gr. in the form of a 20 per cent solution. In such cases a slight but distinct mydriatic action is noted. A similar strength is suitable for operative work on the lens or iris.

Köllner³ notes that the diffusion of alypin through the cornea into the anterior chamber is sometimes associated with reaction on the part of the tissues. While with one or two instillations no change can be observed, many patients after 5 or 6 drops perceive a slight mistiness before the eye, which reaches its maximum intensity in half an hour, and fades as the anæsthesia passes off, in another hour or so. Careful examination with the binocular lens reveals fine, light grey homogenous points inside the cornea. These gradually grow in extent, and form round or oval figures almost covering the cornea. From their situation they seem to form in the deepest layer of epithelial cells or in Bowman's capsule. These spots probably point to a transient alteration in the protoplasm of the cells of the nature of precipitates.

Gebb⁴ has studied this point more carefully. He used rabbits and dogs, and found that 4 or 5 drops caused slight dimness of the cornea, with superficial exfoliation of the epithelium. Stronger solutions, 5-10 per cent, if used in quantity, caused separation of the superficial layer as a diphtheritic membrane in ten minutes, and in many cases the eye was not wholly restored to normal for fourteen days thereafter. Though such strong solutions are seldom required for human beings, he has noted four times, after the use of 5 per cent solution, temporary disturbance of the epithelial covering of the cornea. The defects were rapidly restored. One to 2 per cent solutions leave the human corneal epithelium intact. All the later writers note, in contradistinction to the earlier observations, that alypin causes a slight mydriasis of the pupil, but there is no disturbance of accommodation, and as there is no action on the levator palpebrarum, alypin does not produce the same staring look which is so often noted after cocaine instillations.

Weil⁵ states that the absence of a drying effect on the cornea renders alypin especially useful for manual or vibration **Massage of the Eye**.

Lohnstein⁶ finds that anæsthesia with alypin takes somewhat longer to develop than with cocaine in urethral work.

Max Joseph and Kraus⁷ find the new preparation useful in urological work. In the abortive treatment of acute **Gonorrhœa** of the pars anterior they wash out the urethra with 2 to 3 dr. of a 1 to 2 per cent solution of alypin before using a 1 per mille injection of albargin. For the pars posterior they use a preliminary 2 per cent solution. This same strength they find useful for rendering painless the dilatation of strictures.

Peckert⁸ has used alypin for **Dental Work**. He finds 2 per cent the most suitable strength. It is made up in isotonic solution with normal saline solution, and contains also 1-10,000 parts of adrenalin. This combination is equivalent in anæsthetic power to the 1 per cent solution of cocaine-adrenalin usually employed. The injection should be made on both sides of the alveolar process under considerable pressure. To ensure complete anæsthesia it is necessary to wait for five minutes.

Finder⁹ describes the action of the drug in **Laryngeal and Nasal Practice**. He points out that the action as a vasodilating agent is of advantage in certain cases of hyperplasia of the posterior turbinates. Under cocaine the congestion disappears, and thus it is sometimes difficult to grasp the hypertrophied tissue. A 20 per cent alypin solution painted on the mucous membrane gives satisfactory anæsthesia in rhinological work. In endolaryngeal applications the anæsthesia lasts from six to eight minutes.

All these writers state that they have had no experience of unpleasant results from the use of alypin. On the other hand, Braun¹⁰, after the injection into the skin of a 5 per cent solution, observed gangrene to occur in one instance.

REFERENCES.—¹*Gyogyaszat*, No. 7, 1906; ²*Woch. f. Ther. u. Hyg. d. Aug.* Vol. ix. No. 6; ³*Berl. klin. Woch.* 1905, No. 43; ⁴*Arch. f. Augenheilk.* liii. No. 1; ⁵*Allg. med. Centr. Ztg.* 1905, No. 36; ⁶*Deut. med. Woch.* No. 13, 1906; ⁷*Ibid.* 1905, No. 49; ⁸*Deut. Zahnarzt. Woch. Jahrg.* viii. No. 43; ⁹*Berl. klin. Woch.* 1906, No. 5; ¹⁰*Deut. med. Woch.* 1905, No. 42.

ARGYROL.

Hinshelwood¹ most strongly recommends argyrol in **Ophthalmic Practice**. It has displaced nitrate of silver entirely with him. It is not irritating, even in a 20 per cent solution. Strong solutions must be employed to obtain good effects. Solutions which are exposed to light become somewhat irritating; hence the drug should be dispensed in bottles covered with cartridge paper. In **Conjunctivitis** he uses argyrol in 10 per cent strength for mild catarrhal cases. For granular cases 20 per cent is a suitable strength. In **Ophthalmia Neonatorum** a 20 per cent solution may be freely applied every hour in severe cases, and every two or three hours in mild cases. In using injections of argyrol into the lacrimal sac, it must be remembered that, if by any

cause the drug is injected into the subcutaneous tissue, there is produced a faint but permanent staining of the tissue. Again, after a very prolonged use of the drug, a faint staining of the conjunctiva is produced, but these are the only drawbacks.

REFERENCE.—¹*Ophthalm.* Jan. 1906.

ARHOVIN.

This name has been given to an aromatic fluid formed from the two substances diphenylamine and thymylbenzoic acid. Even in gelatin capsules it is rapidly absorbed, and appears in the urine within half-an-hour. Frank¹ has tested its action in **Gonorrhœic** cases, and states that, even in large doses, it does not irritate the stomach. In bacterial infections of the genito-urinary tract he is of opinion that the irritation is allayed by the use of the drug, and therefore he holds that it may be a useful addition to local treatment in such conditions. Bacteriological examination of the urine passed after large doses of arhovin showed that, though it possessed almost no bactericidal action, the urine was able to prevent the growth of organisms, more especially the growth of gonococci.

On the other hand, Ganz², using injections of arhovin as a 1-5 per cent solution in olive oil, obtained excellent results in gonorrhœa.

REFERENCES.—¹*Berl. klin. Woch.* 1906, No. 31; ²*Ibid.* 1906, No. 38.

ARSENIC.

Cloetta¹ makes the following interesting observations about the immunity obtained to arsenic. He finds that, with fluid preparations, only a certain degree of immunity can be obtained. On the other hand, with solid preparations, the degree to which immunity can be pushed is quite indefinite. During the establishment of this immunity he finds that the amount of arsenic excreted in the urine does not increase, and so he concluded that the effect must be due to a local alteration in the intestinal mucous membrane, by which it absorbs less and less of the drug. He verified this in a dog, which could take without any ill effect 37 gr. of arsenious acid by the mouth. Yet the subcutaneous injection of the ordinary lethal dose for non-immunized animals killed this dog in six hours with all the ordinary features of arsenical gastro-enteritis. He concludes that, if an increasing action on the system is required, arsenic should either be given in a fluid form or by subcutaneous injection.

REFERENCE.—¹*Arch. f. exper. Path. u. Pharmak.* 1906, Bd. 54, Hft. 3.

ASPIRIN.

Dockray¹ reports an unusual form of aspirin idiosyncrasy, in which the use of ten 10-gr. doses was followed by numbness and anæsthesia in all the cranial sensory nerves. With the exception of a transitory ptosis, the motor nerves were not affected. There was no cardiac depression. An acute pain in the right ear was ascribed by Dockray to inflammation of the middle ear.

Langmead² states that he has seen poisoning from this drug, with

symptoms of air hunger and acid intoxication, with excessively acid urine, and the presence of acetone in the urine.

Williamson³ points out that, in the slighter forms of **Diabetes Mellitus**, satisfactory results can often be obtained by the use of aspirin, with a slight restriction of diet, or even without any restriction. The improvement is not due to any disturbance of digestion, but is apparently a direct action of the drug. He employs it in 15-gr. doses three or four times a day.

REFERENCES.—¹*Brit. Med. Jour.* Dec. 20, 1906; ²*Lancet*, June 30, 1906; ³*Med. Chron.* May, 1906.

AURATE OF SODIUM.

Verhoeff¹ believes that in this preparation he has discovered a drug which combines effective germicidal action with absence of any toxic action on the tissue. Sodium aurate is prepared by cautiously adding sufficient 5 per cent solution of sodium hydrate to produce a faintly alkaline reaction with 15 grs. of commercial gold chloride dissolved in 50 cc. of distilled water. To this is then added quickly 100 cc. of a 1 per cent boric acid solution, and the whole thoroughly shaken. The total volume is now brought up to 200 cc. with physiological salt solution, filtered, and kept in a stoppered bottle. This solution, containing 0.5 per cent of sodium aurate, does not irritate the conjunctiva, and is more active as a germicide than a 1-1000 solution of perchloride of mercury. The toxic effect of continuous absorption of large quantities has not been determined, but in local applications to the eye and genito-urinary tract no symptoms of poisoning need be feared. The penetrating power of the fluid is great. How it exerts a bactericidal action is not quite clear, but possibly this may be due to the replacement of some important radicle in the bacterial protoplasm by gold. It does not react with albumin unless it be kept in contact for a very long time.

Henderson, in a supplementary note, points out that, when the solution is shaken up with neutral olive oil, gold is given up, and that it completely coagulates albumin when reduced in its presence by ferrous sulphate or other reducing agents. Possibly the lipoids of the cell wall may have the same solvent action as the oil, and thus the cell is readily penetrated.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* Jan. 27, 1906.

BILE ACIDS.

Croftan¹ holds that the bile acids play an important part in the metabolism of the body. In the bowel they prevent the development of putrefactive bacteria, stimulate peristalsis, and assist in the emulsification of fats. The bile acids may be used in intestinal putrefaction, in hepatic insufficiency, and in gall-stone disease. He gives $\frac{1}{2}$ -gr. doses at frequent intervals, and uses as clinical tests of the amount to be given the following three reactions: Disappearance of sulphides from the fæces the disappearance or great reduction of the aromatic

sulphates in the urine ; and the appearance of bile acids in the urine. There is no danger of giving too much, as the excess merely leads to diarrhoea.

REFERENCE.—¹*New York Med. Jour.* April 21, 1906.

BROMETONE.

This bromine compound contains 77 per cent of bromine. It is obtained by the action of caustic alkalies upon a mixture of bromoform and acetone. It has but little action on the heart and circulation, but exerts a typical bromide action. Kempster¹ has tested its action in a limited number of **Epileptics**. Using 5-gr. capsules three times in the day, he obtained satisfactory results. The action was prompt and characteristic. The seizures were controlled, and lessened in severity and frequency. In none of the cases did it cause nausea or disturbance of the skin.

REFERENCE.—¹*Ther. Gaz.* Feb. 1906.

BROMOFORM.

Tresling¹ reports the following case of fatal bromoform poisoning. A child four years of age was given by mistake one drachm of bromoform. There was immediate vertigo and sleepiness, with contracted pupils, stertorous respiration, and relaxation of the muscles. Death occurred in seven and a half hours.

REFERENCE.—¹*Ned. Tydschr. voor Geneesk.* 1906, No. 12.

BROMOTAN.

This name has been given to a preparation obtained by the interaction of formaldehyde, tannate of bromine, and urea. It is a fine powder, without any odour. Mixed with nine times its volume of zinc oxide it is recommended by Rockstroh¹ as a suitable dusting powder for weeping eczemas and for relieving itching.

REFERENCE.—¹*Ther. Monats.* April 1906.

CALCIUM (Salts of).

Ross¹ finds that a certain form of **Lymphatic Headache** is associated with deficient coagulability of the blood. In such instances **Chilblains** are common. In these cases he recommends the use of calcium lactate 15 gr. thrice daily, along with regulation of the bowels and a suitable dietary.

Stevens² finds calcium salts very useful in chilblains. He gives as a rule 10–13 grs. of calcium chloride in liquorice extract thrice daily. Improvement is obtained in two or three days. In a further communication³ the same writer states that calcium salts act very well in chronic foul-smelling **Ulcers** of the leg. He finds that calcium chloride in 15-gr. doses thrice daily rapidly removes the odour, while under 2 grs. of calcium iodide the ulcers heal up in a marvellous fashion.

Netter⁴ has found that the administration of chloride of calcium prevents the appearance of **Serum Rashes**. He tested the action in a series of 516 children who received serum treatment in diphtheria.

The cases were divided into two equal portions. The first lot of 258 children received calcium chloride. On the day of injection 1 gram was administered, and this amount was repeated on the two following days. Serum rash was noted in 6 per cent of this series, whereas in the other group of cases which received no calcium chloride, 40 per cent subsequently showed the rash.

Koster⁵ has used calcium chloride for some years in affections of the **Cornea** and **Conjunctiva**. A 3 per cent solution is usually employed, either as eyedrops or as an irrigation, three or four times in the day. It causes almost no pain, and is without any deleterious action on the conjunctiva. He finds it useful in all acute and chronic forms of conjunctivitis, especially in those chronic forms in which slight ulceration of the cornea occurs. The drug exerts both an astringent and antiseptic action.

REFERENCES.—¹*Lancet*, Jan. 20, 1906; ²*Brit. Med. Jour.* April 7, 1906; ³*Ibid.* July 21, 1906; ⁴*Arch. Gén. de Méd.* 1906, No. 8; ⁵*Nederl. Tydschr. voor Geneesk.* 1906, No. 16.

CAMPHOR.

Volland¹ thinks that the persistent use of subcutaneous injections of 10 per cent oleum camphoratum should be tried in cases of **Phthisis** in which the cardiac action is weak. He gives two injections, either at the one time or morning and evening, representing 6 grs. of camphor in the twenty-four hours. With the improvement in the circulation, the night sweats disappear. Happich² does not believe in the indiscriminate use of camphor. He considers that it is a dangerous drug to use in patients with disturbance of the carbohydrate metabolism, in cachectic and diabetic conditions, in advanced heart disease, in severe sepsis, or in eclampsia. He objects strongly to its use in eclampsia and mental excitement, since the drug acts chiefly upon the central nervous system.

Mayer³ has for a number of years, in the treatment of **Erysipelas**, combined the internal administration of camphor with external antiseptic applications. He gives 2 gr. of camphor every hour or every two hours, and to encourage sweating, follows it up with copious hot drinks. He thinks that the camphor assists the leucocytes in their efforts to overcome the infecting germs.

REFERENCES.—¹*Ther. Monats.* Feb. 1906; ²*Centr. f. Gyn.* Dec. 30, 1905; ³*Münch. med. Woch.* 1905, No. 42.

CARBOLIC ACID.

Laurent¹ treats **Tuberculous Glandular Abscesses** on the following plan. The abscess is punctured with a sharp needle, which must be introduced through intact skin, and 1 cc. of 5 per cent solution of carbolic acid is injected into the abscess cavity. This procedure is repeated every fourth day, and the abscess is healed by the end of the third week. The procedure gives good results, and causes neither pain nor inflammatory reaction.

REFERENCE.—¹*Thèse de Paris*, 1905.

CEPHALDOL.

This new antipyretic consists of a chemical combination obtained by acting upon phenetidin with a mixture of citric and salicylic acids. Any free acid is neutralized with sodium carbonate, or combined with quinine. The resulting preparation is a yellowish-white powder, slightly bitter in taste. It is readily soluble in alcohol, but does not dissolve easily in water. The ordinary dose is 0.5–1 gram, but as much as 2 grams may be given. The maximum daily amount should not exceed 5 grams.

Fritsch¹ has tested the drug on a series of 60 patients, and finds that it is a reliable **Antipyretic**, which acts within half an hour. There is some sweating. The antipyretic action lasts from two to six hours after doses of 1 gram, but smaller amounts cause a more gradual fall, and the action is more prolonged. The drug does not exert a depressing action on the circulation. The febrile heart is slowed, but the peripheral pressure remains within the normal limits. It also possesses antineuralgic properties. It acts well in **Lumbago**, **Sciatica**, and in pure forms of **Nervous Headache**, but in headache due to anæmia or hyperæmia its action is not so good. Lastly, the drug exerts a surprising influence as an **Anhydrotic**. This effect was noted in a small series of phthisical patients. The action is rapidly obtained, and as a rule is evident within half an hour of administration.

REFERENCE.—¹*Wien. klin. Woch.* 1906, No. 33.

CHLOROFORM.

Rothschild¹ has noticed that, in a certain proportion of cases of **Whooping Cough**, the inhalation of chloroform is followed by great and permanent improvement in the number of the attacks. He does not put the children very far under, and keeps them chloroformed for about five minutes.

REFERENCE.—¹*Bull. Méd.* 1906, No. 40.

CITRATE OF SODIUM.

As a routine and cheap method of rendering cows' milk more suitable for the digestion of infants, Poynton¹ recommends the addition of 1–2 gr. of sodium citrate to the ounce of milk. The clot which forms from the addition of hydrochloric acid and rennet is much more loose and friable than with untreated milk. He uses the sodium salt when weaning healthy children, for milk dyspepsia, and when giving milk in a more concentrated form. The addition of 2 gr. to the ounce does not affect the taste or reaction of the milk.

Shaw² also speaks very highly of this method. He is unable to state what chemical change takes place, but finds clinically that the addition of citrate of soda was extremely valuable for controlling the **Vomiting** of chronic gastric catarrh. He says that the use of the citrate only benefits those cases in which the gastric disturbance is caused by proteids.

REFERENCES.—¹*Med. Press*, Oct. 11, 1905; ²*Arch. Ped.* Mar. 1906.

CLAYIN.

Vahlen¹ claims for clavin that it represents the ecboic principle of ergot. It is a crystalline substance soluble in water, of definite chemical constitution, and it exerts a specific action upon the uterus. It is devoid of any general toxic action, and causes neither convulsions nor gangrene. For adults, he gives 0.02 gram injected into the subcutaneous tissue. In several cases of **Inertia of the Uterus**, this amount induced powerful contractions. A more or less marked effect was obtained in a series of 20 cases in which the drug was administered in the third stage of labour.

Labhardt² has tested the drug in 32 cases. Out of 10 cases of uterine inertia, 1 did not react at all, in 2 the reaction was but slight, and in one of these, severe post-partum hæmorrhage occurred, but ceased on repeating the drug, and using hot irrigations. In the other 7 cases a prompt action was obtained, though often the dose of 0.02 gram had to be repeated. In a series of 20 cases in which it was tried during the third stage of labour, clavin acted more surely, as in all instances an effect was obtained, though frequently only on repeating the dose. Its action in two cases of abortion was also satisfactory. No unpleasant side action developed, and Labhardt considers that it is as effective as ergotine. The first contraction comes on within fifteen minutes, and the effect lasts for about two hours.

REFERENCES.—¹*Arch. f. exper. Path. u. Therap.* July 20, 1906; ²*Münch. med. Woch.* 1906, No. 3.

COLLARGOL.

Crédé¹ recommends this preparation of colloid silver as an ideal antiseptic for operation and septic wounds. It is non-irritating, and is soluble in serum. He uses it in the form of a dusting powder, containing collargol 3 parts to 97 parts of sugar of milk. This powder is at first grey, but on coming into contact with moist tissue it turns brown. It is three times as cheap as iodoform. Collargol is also used in 1 per cent solution as an irrigation.

Voelker and Lichtenberg² employ collargol in **Cystitis** in preference to other drugs. It does not irritate or cause pain, and cures the inflammation. For ordinary cases 3 or 4 oz. of a 1 per cent solution may be injected and left in the bladder.

† Riebold³ strongly recommends the intravenous injection of this preparation in joint affections. He found the injections specially valuable in **Gonococcic Arthritis** and in subacute forms of **Rheumatic Fever**. He employs a 2 per cent solution, and injects as an initial dose from 4–8 cc. For subsequent doses the amount is raised to 6–10 cc. The injections relieve the pain, reduce the swelling and temperature, and render the joints more mobile. If these symptoms become worse, the injection may be repeated after a day's interval. As a rule, a series of three injections suffices to establish a cure.

† REFERENCES.—¹*Münch. med. Woch.* 1906, No. 24; ²*Ibid.* 1905, No. 33;

³*Ibid.* 1906, No. 32.

COPPER.

Bevan¹ has found the use of copper salts of considerable value in cases of **Actinomycosis** and **Blastomycosis**. Abdominal and lung manifestations of actinomycosis do very badly with potassium iodide, and in these cases it is worth trying the effect of copper sulphate in doses of $\frac{1}{4}$ gr. three times daily. This may gradually be increased to 1 gr. thrice daily.

Galezowski² reports a case of toxic **Amblyopia** which occurred in a man fifty-seven years old. The history was that for many years he had used a musical instrument with a copper mouthpiece.

It has been asserted at various times that the presence of a trace of soluble copper exerts a destroying action on micro-organisms present in ordinary running water, and as long ago as 1904 Moore and Kellerman pointed this out with regard to typhoid bacilli. Recently the subject has again attracted attention, and Watkins-Pitchford³ has reopened the discussion. He finds that 1 part of copper sulphate to 100,000 parts of water is sufficient to destroy the ordinary bacterial flora of running water if allowed to act upon it for twenty-four hours, while 1 part to 75,000 parts water, i.e., 1 gr. to a gallon, will destroy the vitality of typhoid bacilli in three hours. Even copper vessels presenting a sufficiently large surface exert a certain restraining influence upon bacterial life in the water they contain.

Clark and Gage⁴ are by no means so definite in their advocacy of the copper salts. They insist that previous observers have not employed proper technique in their experiments, and conclude that the treatment of water with copper salts or the storage of water in copper vessels has little practical value for the following reasons: The method is unreliable, and the time necessary to obtain sterilization is so long, that the method would be of no practical use. Though very weak dilutions of 1-100,000 occasionally remove bacteria, still, to be reasonably certain, a solution of 1-1000 is required, which renders the water unfit for use. Further, they found that occasionally a very dilute solution of copper sulphate or colloidal copper absorbed from clean copper plates exerted a stimulant action upon the growth of bacilli.

REFERENCES.—¹*Med. Rec.* Dec. 2, 1905; ²*Recueil d'Ophth.* Oct. 1905; ³*Lancet*, Oct. 28, 1905; ⁴*Jour. Infect. Dis.* Feb. 1906.

DIACHYLON.

Hall and Ransom¹ show that the use of diachylon as an **Abortifacient** has gradually spread in certain parts of England, so that they have been able to ascertain that within a comparatively limited area as many as 100 cases a year come under medical treatment. The preparation is also used to prevent conception. They suggest as a remedy that the sale of diachylon should be entirely prohibited, or that it should be scheduled under the Poisons Act. That lead reaches the foetal circulation is shown by the fact,² that the liver of the child contains considerable quantities.

REFERENCES.—¹*Brit. Med. Jour.* Feb. 24, 1906; ²*Ibid.* Feb. 8, 1906.

DIGALEN.

This soluble form of digitoxin gives good results in the treatment of **Cardiac Disease**. Schwyzer¹ finds that it acts quicker than digitalis, especially if given subcutaneously. It is not cumulative, and the action can be maintained for long periods. The individual dose is $\frac{1}{3}$ mgm, representing 0.1 gram of powdered digitalis leaf. It is put upon the market as a standard solution containing 0.3 mgm digalen in each cc. of fluid. This amount may be given three or four times daily. In cases of weak heart, as a prophylactic measure before giving a general anæsthetic, it is a good plan to inject $\frac{2}{3}$ mgm digalen a few hours previously.

The experiences of the Turin Hospital² with digalen are on the whole favourable. It is well borne by the stomach, and causes no pain if injected into the subcutaneous tissue, while signs of accumulation are seldom seen.

Livierato³ states that the preparation has a marked action on the heart and circulation. The cardiac dullness is reduced. The diastole is distinctly prolonged, while the systole is strengthened. The pulse becomes less frequent, but fuller and more regular, while the blood-pressure is rapidly raised. Diuresis is greatly stimulated. The drug presents the following advantages over other digitalis preparations. It is completely soluble in water, constant in strength, and therefore easily administered. As a rule, it is given by subcutaneous injection, but it may also be administered by the mouth. In exceptional cases it is injected directly into a peripheral vein. The daily dose for subcutaneous use was 3 to 4 cc. of a standard solution representing 0.9 mgm of the soluble digitoxin. For internal administration 4 to 5 cc. of the same solution (1.2 to 1.5 mgm) digitoxin were given in the day.

Marini⁴ holds that digalen is preferable to digitalis, in that it acts more rapidly but is less cumulative. He notes specially the increase in the volume of the pulse, along with diminished peripheral pressure in the vessels.

Other writers insist upon the rapidity with which the action is manifested. Thus Winckelmann⁵ using it in a case of pneumonia found that the blood-pressure rose from 75 to 110 Mg. Hg. in fifteen minutes, and the pulse fell from 140 to 120 in half an hour. Freund⁶ got an immediate effect from injecting digalen into a vein in a case of acute dilatation of the heart from strain. The pulse fell immediately from 120 to 76, and the symptoms were speedily relieved.

Ketly⁷ concludes that digalen is superior to the galenical preparations of digitalis in respect that its composition is definite and fixed. It acts more quickly, has no cumulative action, can be accurately dosed, and causes no irritation of the stomach. It is better to administer it by the mouth, as the subcutaneous use causes local irritation, and acts no more rapidly than with oral administration.

Grassmann⁸ holds that the special benefit of digalen is freedom

from gastric irritation, with rapid, energetic, and prolonged action upon the circulation.

REFERENCES.—¹*Med. News*, Nov. 1905; ²*Gaz. deg. Osped.* Aug. 17, 1905; ³*Wien. klin. Woch.* 1905, No. 51, 52; ⁴*Riv. Crit. d. Clin. Med.* 1906, No. 7-9; ⁵*Ther. Monats.* July, 1905; ⁶*Ibid.* Dec. 1905; ⁷*Ibid.* June, 1906; ⁸*Münch. med. Woch.* 1906, No. 3.

DIMAL.

This substance is recommended by Angelilio¹ as a dusting and drying powder in **Excessive Sweating**. It does not cake, and by virtue of its antiseptic property it acts as a deodorant. Dimal is the salicylate of didymium. He uses it in **Intertrigo** of obese individuals, in sweating of the feet and hands, and in **Eczema**.

REFERENCE.—¹*Gaz. deg. Osped.* Feb. 6, 1906.

DIONIN.

Von Arlt¹ finds that the action of dionin intensifies that of atropine, and he makes use of the combination of these two alkaloids in breaking down old **Synechiæ**, which do not yield to the action of atropine alone.

Winterberg² has noticed that the use of therapeutic doses of the drug is followed by a slight constipation. He has availed himself of this action in cases of **Enteritis** with satisfactory results.

REFERENCES.—¹*Woch. f. Ther. u. Hyg. d. Aug.* Dec. 28, 1905; ²*Med. Chir. Centralb.* 1905, No. 24.

EPIDURAL INJECTIONS.

Epidural injections are recommended by various writers in severe **Neuralgia**, e.g., sciatica, and the crises of locomotor ataxia. The fluid—either cocaine or physiological salt solution—is injected at the lower portion of the sacrum, through the lower sacral obturator membrane, into the space between the periosteum and the dura mater. Buzi¹ reports 8 cases treated with this method.

REFERENCE.—¹*Il Policl.* April, 1906.

ERGOT.

Gangrene from the medicinal administration of ergot is extremely uncommon. McKay¹ reports a case in which a woman, who used large doses of ergot with the view of inducing abortion, developed gangrene in the tips of several fingers.

REFERENCE.—¹*Brit. Med. Jour.* Aug. 18, 1906.

EUCALYPTUS.

Phillips¹ recommends eucalyptus in **Ankylostomiasis**. A saline purge is given at night, and on the following morning, on an empty stomach, the following mixture is given in two portions, with an interval of half-an hour:—

R	Essence of Eucalyp.	grams 2·50	Castor Oil	grams 40
	Chloroform	grams 3·50		

If the patient is young or very anæmic, the mixture is given in three portions. After the dose, the patient remains in bed without any food till the bowels act.

Several cases of poisoning with oil of eucalyptus have been reported in the past year. Myott's² patient died forty hours after swallowing a dose of 6 dr. There was cyanosis and difficult respiration. Post mortem, congestion of the lungs, with redness of the bronchi and trachea, were discovered. The danger of too large doses is also shown by cases reported by Taylor³ and Benham⁴. Two severe cases of poisoning in children were reported by Orr⁵ and Benjamin⁶. In both instances large quantities were swallowed, and the patients became profoundly comatose, but both recovered.

REFERENCES.—¹*Sem. Méd.* Feb. 7, 1906; ²*Brit. Med. Jour.* Mar. 10, 1906; ³*Lancet*, Sept. 30, 1905; ⁴*Ibid.* Dec. 30, 1905; ⁵*Brit. Med. Jour.* May 12, 1906; ⁶*Lancet*, June 9, 1906.

FIBROLYSIN, THIOSINAMINE.

Weisselberg¹ reports a case of **Œsophageal Stricture**, following the accidental swallowing of a solution of caustic potash, in which the continued use of fibrolysin enabled him to carry out successful bougie treatment.

Teschemacher² treated four cases of **Dupuytren Contraction** with thiosinamine. In two of the cases a good result was obtained. The contracted bands became softer, and the use of the hand was regained. Fibrolysin was less painful and acted more rapidly than thiosinamine.

Mohr³ found that a cicatricial band which caused a **Stricture of the Parotid Gland**, gradually softened under the continued use of thiosinamine injections.

Caudwell⁴ successfully treated a case of **Hypertrophy of the Pylorus** with thiosinamine injection. During a treatment extending over three months, the tumour became much smaller, and the symptoms pointing to obstruction became much less marked.

McCullagh⁵ gave thiosinamine in a series of cases of **Ear Disease** associated with the formation of connective tissue. He administered the drug by the mouth, and found that the hardened tissues became softer, and this increased pliability allowed the usual methods of treatment to exert a better effect. He finds that thiosinamine gives better results than any other drug, in the relief of tinnitus.

Vogelsanger⁶ injected fibrolysin in a series of gynæcological cases, and found that, in about one half of the cases, a very definite improvement was effected by the injections. The favourable results were obtained mostly in cases of laceration of the cervix and contraction of the larger uterine ligaments.

Remete⁷ employed thiosinamine in twenty cases of **Stricture of the Urethra**, and found that the injections softened the cicatricial tissue, so that gradual dilation was made more easy, and thus the cure was shortened. As a rule, the injections cause but little discomfort, especially if fibrolysin be used, and if it be injected into the gluteal muscles.

An occasional idiosyncrasy is the development of a very itchy rash, while Brinitzer⁸ reports a case in which the use of thiosinamine was always followed by a distinct rise of temperature.

Gunert⁹ reports favourably on the effect of thiosinamine injections in the treatment of the skin cicatrices of **Lupus**, and in post-neuritic **Optic Atrophy**. The hyperæmia induced by the drug contra-indicates its use in detachments of the retina or opacities in the vitreous humour.

On the other hand, Offergeld¹⁰ after a very careful study of 55 gynæcological cases, comes to the conclusion that thiosinamine had no influence upon the inflammatory lesions, either in the acute or chronic stages.

REFERENCES.—¹*Münch. med. Woch.* 1906, No. 33; ²*Ther. Monats.* Jan. 1906; ³*Ibid.*; ⁴*Brit. Med. Jour.* Feb. 17, 1906; ⁵*Med. News*, Dec. 30, 1905; ⁶*Cor.-Blatt. f. Schweiz. Aerzte*, Feb. 19, 1906; ⁷*Centr. f. Harn. u. Sex. Organ.* 1905, xvi. 215; ⁸*Berl. klin. Woch.* Jan. 22, 1906; ⁹*Versamm. d. Ophthal. Gesell. z. Heidelberg*, 1906; ¹⁰*Münch med. Woch.* 1905, Nos. 37, 38.

FORMAMINT.

This preparation is a combination of formaldehyde with menthol and sugar of milk. It is specially recommended as a disinfectant for the mouth. Rheinboldt¹ states that it increases salivation, and acts well as a disinfectant and germicide in the mouth. He recommends it in all cases where such an action is required in the mouth and pharynx.

Murrell² finds it useful in **Pyorrhœa Alveolaris**, and a most valuable remedy for **Flatulence**. Zwillinger also speaks well of it in **Tonsillitis**, and in the **Sore Throat** of diphtheria and scarlet fever. He found that by the administration of this preparation he could obtain a formaldehyde effect upon the genito-urinary system.

Schwarzenbach³ has found it useful in **Streptococcic Infections**, in **Erysipelas**, **Erythema Nodosum**, and in **Tonsillitis** and **Pharyngitis**.

REFERENCES.—¹*Deut. med. Woch.* 1906, No. 15; ²*Med. Press*, April 18, 1906; ³*Cor.-Blatt. f. Schweiz. Aerzte*, in *Lancet*, Oct. 23, 1905.

FORMIC ACID.

Livierato¹ states that formic acid has a distinctly depressant action on the myocardium. It weakens the cardiac force, slows the heart, and leads to irregularity of action, with final arrest. Sodium formate has the same action, save that in small doses it at first stimulates the heart and raises the arterial pressure.

Marine² found that sodium formate used in hypodermic injection in rabbits and dogs had a favourable effect on the blood. Small doses increase the number of corpuscles and the amount of hæmoglobin. Larger doses may have an opposite effect.

Jacquau³ used local instillations of sodium formate for **Ocular Fatigue** due to defective accommodation. In most cases a certain amount of relief was obtained. The drug acted more upon the motor muscles than upon the ciliary muscles, and he concludes that formate of soda augments the power of the extrinsic muscles of the eye and retards visual fatigue.

Convers⁴ gives a very guarded opinion about the efficacy of the drug in mental conditions. He gave 45 gr. of formate of soda to

30 patients every day for over a month, and found in many cases an increase in appetite and improvement in digestion, but he is doubtful whether it has any direct influence upon the mental state, though it has a beneficial action on the general condition. It seemed to act badly on epileptics whose bodily condition was poor.

Stern⁵ employs the diluted acid in certain general diseases. It is not any good in gout, and in acute rheumatism is inferior to sodium salicylate. In the form of a saturated formic acid-iodine solution he has found it useful in **Inoperable Cancers**. This solution is made by dissolving $\frac{1}{2}$ gram iodine in 60 cc. formic acid. He also uses this solution in cases of **Intestinal Intoxication** in doses of 2-5 drops well diluted. It exerts an antidotal action. In secondary and tertiary **Syphilis** it acts splendidly. It is less depressing than potassium iodide. In these conditions it should be given in small doses well diluted, and the dose may be gradually increased. In **Phthisis** an experience with upwards of 800 cases had taught him that formic acid, either alone, or in combination with iodine, is of distinct value. It favours the production of fibrous tissue. The action of formic acid in healthy individuals is as follows: In doses of 2 drops well diluted it gives rise to no symptoms, except occasionally a slight irritation in the throat and warmth in the stomach. In 5-drop doses there is irritation of the throat. Ten drops act as a mild diuretic and diaphoretic. Twenty-drop doses act in the same way, but, in addition, there is some stimulation of the stomach, leading to contraction of the empty viscus. Larger doses of 45-60 drops well diluted, cause, in addition, ringing in the ears, slight vertigo, lassitude, and elevation of temperature, followed in thirty to sixty minutes by marked perspiration and increased micturition.

REFERENCES.—¹*Gaz. deg. Osped.* Nov. 26, 1905; ²*Gior. Internaz. d. Scienze Med.* Sept. 1905; ³*Lyon Méd.* Sept. 17, 1906; ⁴*Annal Méd.-Psychol.* 1906, No. 3; ⁵*Jour. Amer. Med. Assoc.* 1906, No. 17.

FORMICIN.

This substance, a formaldehyde acetamide, has been suggested as a substitute for iodoform injections. Formicin is a thick, syrupy fluid, which mixes in any proportion with water. Bartholdy¹ states that metallic instruments are not attacked by the solution. The drug is not toxic, as much as 3 grams daily having been given for weeks without any ill effects. He recommends the preparation for injection purposes. A 5 per cent aqueous solution is suitable for injecting, instead of iodoform glycerin, into **Tuberculous Joints, Abscesses**, etc. It is not painful, and gives as good results as iodoform. A distinct advantage is that the injection can be made through an ordinary hypodermic needle. In chronic **Rheumatism** with effusion, injection into the joints proved wonderfully successful. A 2 per cent solution can be used for washing out the bladder, or an empyema. For disinfecting the skin, 1 per cent is sufficient if the solution is to be kept in contact with the skin for some time, as stronger solutions tan the skin.

REFERENCE.—¹*Deut. med. Woch.* Oct. 5, 1905.

GNOSAN.

Perhaps no remedy for **Gonorrhœa** has in recent years received a more unanimous chorus of approval than this preparation. The necessary cold douche for this indiscriminate praise has been administered by Schindler and Siebert¹, who tested the bactericidal power of the urine of patients taking gonosan on a suspension of gonococci in ascitic fluid and in urine suspensions. Even after a contact of sixty minutes, subcultures show that no inhibitory effect was produced by the gonosan-urine. Even a solution of gonosan 1-1000 has no bactericidal power. They conclude that gonosan, whether given internally or applied locally, has absolutely no action on the gonococci.

Saer² came to the same conclusion from a series of bacteriological examinations carried out on 50 patients. These represented acute cases of gonorrhœa which had received no other treatment than gonosan. Gonosan was well borne, and did not upset the digestion. The burning and discharge rapidly diminished under its use, but the disease was not cured in the majority of cases. In only six, i.e. 12 per cent, was a definite bacteriological cure observed. In the remaining cases, despite the gonosan treatment, gonococci remained in the discharge for long periods, though the discharge had shrunk to very small proportions. Further, an extension backwards of the disease to the posterior urethra was noted in 26 per cent of the cases.

REFERENCES.—¹*Deut. med. Woch.* July 5, 1906; ²*Münch. med. Woch.* Nov. 14, 1905.

GUAIACOL.

Maldarescu¹ during the years 1890-1904 has treated 775 patients with **Pneumonia** by means of external applications of guaiacol to the back. Fifty-nine of these cases died, the others recovered. Ninety to 120 minims of the fluid drug are applied to the skin of the back over the affected area, and the site of application is then covered with cotton wool. If at the end of six to seven hours the temperature has not reached normal, the application is repeated. After three or four days of guaiacol treatment the temperature remains down. Under the influence of the drug the respirations are easier, and the sputum is more readily expectorated. The treatment is only contra-indicated in cases of disease of the heart, and some care is required in using it in children and delicate women, as the skin is very sensitive.

REFERENCES.—¹*Allg. med. Centr. Ztg.* 1905, No. 26.

HELMITOL.

This new derivative of formaldehyde is stated to be a better **Urinary Antiseptic** than urotropin, as the formaldehyde portion is readily split off, even in alkaline urine.

Mandrilla¹ prefers helmitol to urotropin for general work. It requires somewhat larger doses, but this is not a disadvantage, as the drug is well borne by the stomach, and does not cause any renal irritation. He finds that it acts better than urotropin in chronic cases, and it is more agreeable for the patient on account of the slightly acid flavour.

Wittauer² finds this preparation a useful prophylactic for operations after which it is necessary to use the catheter. Using 1 gram thrice daily in a series of 26 such cases, he only once had a severe cystitis, and in 22 of the cases no cystitis developed.

Miserocchi³ used helmitol as a precautionary measure against **Nephritis** in 15 cases of scarlet fever. The daily dosage varied from 1½ to 7½ gr. according to the age, and this amount was divided into four equal portions. The treatment was given for four days, and then, after an interval of ten days, it was continued for a week. The result was very satisfactory, only one case showing even a trace of albumin.

REFERENCES.—¹*Wien. med. Presse*, 1906, No. 7; ²*Centr. f. Gyn.* 1906, No. 23; ³*Gaz. deg. Osped.* 1906, No. 30.

HORDENINE.

A white crystalline alkaloid has been isolated from the germinating seeds of barley. The physiological action of the new alkaloid has been investigated by Camus¹. The sulphate is only slightly toxic. Dogs require as a minimum lethal dose 0.3 gram per kilo if injected directly into a vein, while 2 grams by the mouth have proved fatal. In large doses it produces symptoms of cortical and bulbar origin, and kills by arrest of respiration. In small doses it slows the heart by acting on the pneumogastric. It delays the action of certain ferments, e.g., pepsin, pancreatic juice, but invertin and maltase are not affected. The drug exerts a powerful antiseptic action on certain bacterial growths.

REFERENCES.—¹*Gaz. d. Hôp.* Jan. 16, Feb. 1, and Feb. 20, 1906.

HYPNOTAL.

Diethyloxyacetyl urea, to which this name is given, is a clear oily fluid which, as a sodium salt, occurs in soluble, flaky crystals. From its chemical constitution it seems likely to prove suitable as a **Hypnotic**. Houghton¹ has investigated its action on cold- and warm-blooded animals, and shows that it is relatively a non-toxic substance, which produces a prompt hypnotic action without danger. Pulse-rate, blood-pressure, and respiration are but slightly affected by reasonably-sized doses. Large doses induce complete anæsthesia, from which recovery is perfect.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* Dec. 23, 1905.

IODINE.

Boveri¹ has found that iodine exerts a favourable influence on the **Atheroma of the Aorta** produced experimentally in rabbits by the administration of adrenalin.

Pouchet² holds that the action of iodine and iodides upon the circulation is not direct, but is secondary to their action upon the lymphatic system and the blood. He points out that, whereas the action of the iodides and iodine is hypertensive, the freshly expressed juice of the thyroid gland, containing iodated albumins, is hypotensive.

He considers that iodated albumins and thyroid gland preparations are very unstable. In contact with air, their action as regards vascular depressants is materially weakened, but their general toxic action is not much altered, and this explains many of the disagreeable consequences which have resulted from their toxic action upon the nervous system and metabolism.

Heusner³ has found that a solution of iodine in benzene 1-1000 is suitable for **Disinfecting the Hands** for surgical operations. His procedure is as follows: He pours about 300 cc. into a basin, and scrubs his hands with a nailbrush for about five minutes; they are then rinsed in a fresh basin of the solution, dried with gauze, and rubbed with 2-1000 iodized vaselin.

REFERENCES.—¹*Deut. med. Woch.* 1906, No. 22; ²*Acad. de Méd., in Lancet*, Jan. 13, 1906; ³*Centr. f. Chir.* 1906, No. 7.

IODINE-GELATIN.

Italian medical literature contains numerous articles praising the therapeutic action of this preparation in **Tuberculous Cases**, more especially in **Tuberculous Peritonitis**. The treatment consisted in the subcutaneous use of 5 cc. each day, or the oral administration of 25 cc. Guiseppe¹ reports four cases which illustrate in a marked fashion the beneficial influence of this treatment. Castellani² finds that it increases appetite, strength, and weight, and uses it with success in **Chlorosis**.

The same preparation has also been used in **Syphilis**. Pergola³ found that the urine commenced to excrete iodine forty-eight hours after the subcutaneous injection, and that the excretion continued for three or four days thereafter. In a previous paper⁴ he studied the action of subcutaneous injection and oral administration of sclavo—a 2 per cent iodine-gelatin preparation—upon the blood of syphilitics. It caused increase of hæmoglobin, and at first increase, followed later by slight diminution, in the number of red corpuscles. The total leucocytes were diminished, but the mononuclears and eosinophiles were increased. Along with this there was increase of body weight and disappearance of syphilitic manifestations.

REFERENCES.—¹*Gaz. deg. Osped.* Dec. 7, 1905; ²*Ibid.* Oct. 1, 1905; ³*Ibid.* 1905, No. 46; ⁴*Riv. Crit. d. Clin. Med.* 1905, Nos. 20 and 22.

IRON.

Astolfoni¹ induced blood changes in rabbits by administering to them phenylhydrazine. In treating the anæmia thus produced he found that organic preparations of iron like ferratose were far preferable to inorganic salts.

Randall² recommends Meissner's modification of Bland's pills, in which the exsiccated constituents of the official pil. ferri are enclosed in air-tight gelatin capsules filled with cod-liver oil. The exclusion of air and moisture prevents chemical change taking place till the capsule dissolves in the stomach.

Moutier³ recommends the subcutaneous use of gluconate of iron in

anæmic conditions. Every second or third day an injection of 5 gr. is made slowly into the fatty portion of the buttocks, until ten injections have been made. This course may have to be repeated once or twice in severe cases. When, under this treatment, there is a great increase in the number of red cells, regeneration is seen to consist of two stages. In the first, the number of red cells increases, but the hæmoglobin lags behind. In the second stage, the number of red cells remains fairly constant, but each cell becomes richer in hæmoglobin.

REFERENCES.—¹*Lo Speriment.* 1905; ²*Brit. Med. Jour.* Nov. 20, 1905; ³*Arch. Gén. de Méd.* 1906, No. 14.

ISOPRAL.

Wassermeyer¹ finds this preparation—trichlorisopropylalcohol—a useful hypnotic in mental conditions. It occasionally causes headache on the day following administration.

Klatt² states it is a pleasant, but not always reliable, hypnotic in sleeplessness of **Neurasthenia** and depressed conditions, and a useful sedative in **Excited Mental States**. It is useless in epilepsy and in sleeplessness due to pain. In **Asthma** it acts as a hypnotic, but has no antispasmodic effect. It should not be used in myocarditis or failing heart.

Tauszk³ holds that it is a useful drug to alternate with other hypnotics when the patient is showing signs of becoming habituated to them. Isopral has little action on the circulation or respiration, and induces sleep rapidly without any preliminary excitement stage. On the other hand, he has noticed in a number of cases a distressing headache on the following day. He notes a certain degree of **Antineuralgic** action, which enables tabetic patients, suffering from lancinating pains, to get to sleep without the aid of morphia. In phthisis the drug is useful, as it induces sleep, which, however, is not very profound, so that the patient wakes up and coughs when the secretion accumulates, and then peacefully goes off to sleep again.

Morselli⁴ finds that for **Sleeplessness** an ordinary dose varies from 0.25 to 0.50 gram. In acutely excited conditions it may be necessary to give as much as 1.5 gram of the drug. He never noticed any unpleasant action, but in some cases tolerance was rapidly established. During sleep the pulse is reduced in tension and rate, and respirations are somewhat slower.

REFERENCES.—¹*Berl. klin. Woch.* 1905, No. 37; ²*Heilkunde*, Nov. 1905; ³*Med. Blät.* 1905, No. 52; ⁴*Deut. med. Ztg.* 1905, No. 90.

LACTIC ACID.

Chandler¹ recommends injection of lactic acid in the treatment of **Gonorrhœa** of the cervix uteri. Out of 34 cases he effected a cure in all instances in from one to three treatments. After cleansing the vagina, he draws the cervix into view with a tenaculum, and injects pure lactic acid just beneath the membrane until the whole circumference is covered. In this way he claims that the spreading of the infection to the endometrium is stopped, and a rapid cure obtained.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* Oct. 7, 1905.

LYSOL.

Owing to the ease and cheapness with which this substance could be obtained, it had become the most popular poison in Germany, so that the Federal Government has decided to add lysol to the list of substances which cannot be sold to the public without the prescription of a qualified medical man. Kirchberg¹ states that in poisoning cases the most characteristic symptom is a soporose condition, which comes on rapidly. The circulation is affected; there is rapid, feeble, irregular pulse; the respiration is slow and superficial; the mucous membranes of the mouth, stomach, and intestine are slightly corroded. but there is no secondary stenosis. There is but slight pain. The drug remains a considerable time in the stomach; hence, repeated washing out of the stomach is of great importance. After absorption Blumenthal² states that the drug is excreted in the urine, combined with glycuronic and ethereal sulphuric acids. The chief deposit is obtained in the liver. In two days all the poison is excreted. He recommends washing out the stomach with milk, as cresols are soluble in fat. According to this observer, subsequent disturbances do not occur if the patient survives the first two days. Burghardt³, however, states that he has seen death occur on the fifth day, and frequently the toxic action takes weeks to pass off. Westenhoeffer⁴ has seen parenchymatous nephritis in all fatal cases, and this observation was confirmed in a case of Mosse's⁵.

REFERENCES.—¹*Aerzt.-Sachverständ. Ztg.*, in *Lancet*, Mar. 24, 1906; ²*Münch. med. Woch.* May 15, 1906; ³, ⁴, ⁵*Ibid.*

MAGNESIUM SALTS.

A number of very interesting communications by Meltzer and Auer have been published in various American papers concerning the inhibitory and anæsthetic properties of magnesium salts. An excellent résumé of these papers is given by Meltzer¹. The individual papers appeared in the *American Journal of Physiology*, 1905, No. xiv, p. 366; 1906, xv, p. 387, and 1906, xvi, p. 233. It is found that magnesium salts exert absolutely no stimulating action, but always produce depression. In one series of experiments it was shown that the intravenous injection of magnesium sulphate or magnesium chloride completely inhibits respiration and all movements of the body. Unless artificial respiration is used, the animal dies without any asphyxial struggling. With artificial respiration, the animal recovers, though it may require to be kept up for upwards of an hour. The heart and circulation are very little affected by a dose which inhibits the respiration. The rapidity of injection affects the result. Rapidly injected, $1\frac{1}{2}$ gr. will produce a very profound effect, but in a very slow injection nearly 20 gr. within an hour will scarcely produce any visible poisonous symptoms. This last fact possibly explains why the common use of magnesium sulphate does not cause toxic symptoms, as it is very slowly absorbed and is, therefore, harmless. Magnesium salts applied directly to nerve trunks

completely abolish the function of the nerve. There is abolition of conductivity and local excitability, both of which can be completely restored by washing off the salt with Ringer's solution. The magnesium salt acts like cocaine. Subcutaneous injection induces complete anæsthesia, with perfect relaxation of the muscles. In a further series of experiments, magnesium sulphate was injected into the subarachnoid space in monkeys. In the dose of 0.06 gram (1 grain) to the kilo of body weight, within a minute or two complete anæsthesia and paralysis of the tail and posterior extremities is obtained. Within an hour of the injection the anæsthesia spreads up to the neck, and the animal remains in this state for many hours, but then recovers perfectly.

The effect of this spinal injection was so striking that Meltzer induced a few of his surgical friends to test the action on some of their patients. He is able to refer to 12 cases which have been tested by Haubold, Blake, and Willie Meyer. For human beings the highest dose was about one-third of that employed on monkeys. For each kilo of weight 0.02 gram of the salt was used, or 1 cc. of a 25 per cent solution for each 20 lbs. of body weight of the patient. At first, the anæsthetic action was assisted by a little chloroform, but in the later cases no general anæsthetic was used. It was found that the best time for operation was three or four hours after the spinal injection. By that time, with 1 cc. of a 25 per cent solution for each 25 lbs. of body weight, there is, as a rule, paralysis of the legs and pelvic region, with analgesia sufficient to enable an operation in these parts to be carried out without pain. Sensation and motion return within eight to fourteen hours; retention of urine, necessitating the use of the catheter, may last for a couple of days. In one case after-effects lasted much longer, but Meltzer is inclined to think that this was due to some of the incidents of spinal puncture, and not directly to the magnesium sulphate. He is confident that tapping the spinal cord and washing out with sterile saline solution will shorten or do away with all after-effects. In one case, when by an error 1 cc. of the 25 per cent solution was injected for each 16 lbs. of body weight, a state of deep general anæsthesia was induced, which lasted several hours. The circulation remained normal, but the respirations dropped to 10 per minute. A spinal puncture, by which some of the fluid was let out, and the spinal cavity washed out repeatedly with sterile physiological saline solution, soon restored the respirations to normal. A dose of 1 cc. for each 20-18 lbs. of body weight would permit extensive operations to be performed on the abdomen a few hours after the injection, but Meltzer prefers to operate in two hours with the aid of a little chloroform, and, immediately after the operation is ended, to puncture the spinal canal and let out a quantity of fluid at least as large as that of the injected solution of magnesium sulphate, and then wash out the canal with repeated irrigations of saline solution. With this practice the after-effects are much shorter. He alludes to a case of severe **Tetanus** which was cured by magnesium sulphate injection, and points out that the danger from

magnesium anæsthesia will come practically only from interference with respiration, as the heart and pulse remain unaffected. This will necessitate that hospitals in which the magnesium method is to be used will require a suitable apparatus for artificial respiration, as the ordinary clinical methods are absolutely insufficient for emergency cases.

Blake² reports the case of tetanus referred to, in which recovery followed the use of five intraspinal injections of magnesium sulphate during the course of ten days. The strength of the solution employed varied from 25 per cent to 12·5 per cent. The former strength was only used on the first occasion, when 67 minims were injected; at the other times 2 dr. of the weaker solution were used. In a second case the patient died, but even here the magnesium injections had a marked action on the symptoms. He claims that the injections conserve strength, as they prevent convulsions and pain, and as a result the excessive metabolism and production of heat is avoided. Owing to the relaxation of the muscles of mastication the patient can be nourished by the mouth. The action is prolonged (twenty-nine to thirty-seven hours), and the heart is not depressed, the only bad effect even of repeated injections being inability to empty the bladder. The magnesium sulphate has probably no special action on the tetanus germ, and is merely a good form of symptomatic treatment.

REFERENCES.—¹*Med. Rec.* Dec. 16, 1905; ²*Surg. Gyn. and Obst.* 1906, No. 5.

MELIOFORM.

This preparation contains as its active bases 25 per cent formaldehyde and 15 per cent acetate of silica. It has been warmly recommended by Jacobson¹, Lauper², and Lindemann³; but Meyer⁴, after a careful investigation, finds that its activity is not so great as that of lysol or mercuric chloride, and is unable to recommend it. Valerio⁵ comes to the same conclusion. He has tested melioform in various strengths, and comes to the conclusion that the findings of Jacobson and Laufer are incorrect. He states that melioform is not a strong antiseptic.

REFERENCES.—¹*Med. Klin.* 1905, No. 15; ²*Cor.-Blatt. f. Schweiz. Aerzte*, 1906, No. 1; ³*Deut. med. Woch.* 1906, No. 8; ⁴*Berl. klin. Woch.* 1906, No. 20; ⁵*Ther. Monats.* June, 1906.

MERCURY.

In recent years the practice of giving mercury by subcutaneous injection has grown very popular. That the method is not without danger is shown by two recent cases of severe poisoning. Lenoir and Camus¹ had a patient under their charge who received, at intervals of eight days, four injections of 7 drops of grey oil. She developed intense salivation, with ulceration of the gums and cheeks. There was vomiting, diarrhoea, and albuminuria. Post mortem, ecchymoses of the gastro-intestinal tract and acute nephritis were found. The danger of the injection plan lies in the fact that in the event of salivation

there is no possibility of checking the further absorption of a store of insoluble mercury placed in the tissues.

Sicard's² case was somewhat similar. Three days after the fourth weekly injection of grey oil, toxic symptoms developed: diarrhœa, nausea, stomatitis, and albuminuria. The site of the last injection was excised, and the patient ultimately recovered.

Audry³ has studied the feasibility of administering mercury by the rectum. It is not possible to use aqueous solutions, but Hg can be administered in the form of suppositories containing grey oil. The amount of mercury suitable varies from 0.02–0.04 gram. Mercury appears in the urine within four days after commencing treatment.

Lambkin⁴ gives the following formula for a mercurial cream, which is suitable for intramuscular injection:—

R	Mercury	(by weight)	3j		Paraffin Liq. Carb. 2 % ad 3x
	Lanolin	„	3iv		

Ten minims of cream represent 1 gr. of mercury. This cream is satisfactory as regards fluidity and stability at ordinary temperature, but is liable to separate in hot weather. For climates in which there is much range of temperature, Hill⁵ states that a cream made with a paraffin intermediate in character between paraffin. molle and paraffin. liquidum is preferable.

Klieneberger⁶, from an examination of 37 patients receiving mercurial inunctions, finds that this method of administering mercury is not so harmless as is generally supposed. Almost always changes in the urine developed, due to an action on the secreting parenchyma of the kidneys. This effect is detected early, after even very small doses, and the presence of distinct albuminuria indicates that the kidneys are seriously affected. He recommends the use of great caution in chronic nephritis.

REFERENCES.—¹*Lancet*, Feb. 15, 1906; ²*Ibid.*; ³*Ann. de Dermat. et de Syph.* Oct. 1905; ⁴*Brit. Med. Jour.* Nov. 11, 1905; ⁵*Jour. R.A.M.C.* July, 1906; ⁶*Zeits. f. klin. Med.* lviii. 5.

METHYL IODIDE.

According to Causson¹, methyl iodide is a more powerful **Vesicant** than cantharides, while it is cleaner to apply and does not irritate the kidneys. He applies it to the well-washed skin as follows: A piece of filter paper is moistened with 15–30 drops of the liquid and applied to the part. It is then covered with impervious material and fixed with cotton-wool and collodion. This dressing may be removed in two or three hours, and the vesication commences in from three to eighteen hours.

REFERENCE.—¹*Rép. de Pharmac.* Feb. 10, 1906.

MUIRACITHIN.

This drug is a combination of lecithin with the active principles extracted from a Brazilian tree, *Muira puama*. It is administered in the form of pills, and is stated to possess an aphrodisiac action. It has been used successfully in cases of **Impotence**.

NITRITES.

Hare's plan of treating **Hæmoptysis** by inhalation of amyl nitrite seems to be gaining adherents. Rouget¹ has used it successfully in ten cases. Romme² praised the method; and Soulier and Pie³ found that in four cases the bleeding ceased very rapidly after the inhalation of a few drops of amyl nitrite. In animals, they show that amyl nitrite inhalations reduce the blood-pressure in the general circulation, but raise the pressure in the pulmonary circulation.

Pit and Petitjean⁴ have investigated this action more thoroughly. They find that, of all the drugs they investigated, amyl nitrite has the most powerful vasoconstricting action upon the vessels of the lung. Within a minute of injecting the drug into a peripheral vein, the normal rose tint of the exposed lung becomes replaced by white anæmic patches, which spread and coalesce so as to include nearly all the lung tissue. The vasoconstriction is so great that if, at the moment that the intravenous injection is given, an incision be made into the parenchyma of the lung, the abundant hæmorrhage which results is checked, just as if vessels had been tied.

Lawrason Brown⁵, in hæmoptysis, uses inhalations of amyl nitrite, and maintains the vasodilating action by subsequent administration of nitroglycerin or sodium nitrite.

Raymond⁶ uses injections of sodium nitrite in those cases of lightning pain in **Tabes** that are not benefited by mercurial injections. The method he uses is as follows. A 1 per cent solution is made in distilled water, and 1 cc. is injected every day for ten days. It is then discontinued for ten days, and a second course is given. After a further interval of ten days, the dose is doubled. This dosage is used for ten days, and then, after another period of rest, the strength of the solution is raised to 3 per cent. This form of treatment is continued till forty or fifty injections have been given. By this time, but not before, benefit commences to be visible, and as a rule the improvement is of a permanent nature.

REFERENCES.—¹*Bull. et Mém. de la Soc. Méd.*, in *Med. News*, Oct. 7, 1906; ²*Presse Méd.* Jan. 17, 1906; ³*Lyon Méd.* Dec. 3, 1905; ⁴*Ibid.* Nov. 7, 1906; ⁵*Jour. Amer. Med. Sci.* Aug. 1906; ⁶*Jour. d. Prat.* Dec. 2, 1905.

NOVOCAINE.

Within the past year this substance has been extensively used as a local anæsthetic. Most of the articles dealing with the new preparation come from German observers. Novocaine is a derivative of the class of amino-alcohols. Chemically it is the hydrochloride of p-amino-benzoyl-diethylamino-ethane, represented by the formula $C_6H_4NH_2 \cdot COO \cdot C_2H_4N(C_2H_5)_2HCl$. It dissolves readily in water, and can be boiled without decomposing.

Biberfeld¹ has studied the pharmacological action of the drug. Its action upon peripheral nerves is the same as that of cocaine. A solution of $\frac{1}{4}$ per cent will anæsthetize a large nerve trunk. For anæsthetizing the **Cornea**, a solution of 2-3 per cent is required. On the other hand, a solution of 20 per cent strength is not irritating to

such a delicate structure as the cornea. The general action of the drug after absorption is very slight. Thus 0.15–0.2 gram injected subcutaneously into rabbits causes practically no change in the respiration or circulation. With intravenous injection the pressure is reduced for a short time and the respiration becomes more slow. Compared with cocaine and stovaine the toxicity of novocaine is:—

	COCAINE	STOVAINE	NOVOCAINE
Guinea-pig .. gram	0.01–0.05	0.15–0.17	0.35–0.40—lethal dose
Dog gram	0.05–0.07	0.15	0.25—non-lethal dose

This would seem to indicate that novocaine is four or six times less toxic than cocaine. The author points particularly to the effect of adrenalin on novocaine—so far from diminishing its action, it seems to intensify it.

Braun² has introduced the preparation into surgical practice. According to him, it is an ideal local anæsthetic, which is absolutely free from irritating properties. It increases the anæmia produced by suprarenal preparations, and its anæsthetic power is equal to that of cocaine. It is less toxic, and in solution can be sterilized by boiling. He used it for local anæsthesia and also for spinal analgesia. For infiltration anæsthesia he employs a $\frac{1}{2}$ per cent isotonic solution containing a few drops of adrenalin solution.

Danielsen³ notes that there is no after-pain after local infiltration, and that even in inflamed areas anæsthesia is obtained. Schmidt points out that the anæsthesia is more extensive and more rapidly induced than with cocaine, while the cost of the drug is less.

Other writers who are favourably impressed with the new drug are Duhot⁴, Cieszynski⁵, Sonnenberg⁶, Euler⁷, Lucke⁸, Hermes⁹, Freeman¹⁰, Gelb¹¹, Opitz¹², Fischer. Euler and Fischer describe its value in **Dental Work**. Euler insists that the fluid injected should be freshly prepared. In addition to its employment in solution, novocaine is very useful as a powder for alleviating the pain of acute inflammation of the pulp, and renders the application of arsenious acid painless. Fischer finds that a 1–2 per cent solution enables him to undertake almost every dental operation. As a sedative paste containing arsenic he recommends the following: a gram each of arsen. acid, novocaine, and iodoform, made into a paste with a mixture of equal parts of glycerin and fifty per cent of chloroform in alcohol. Freeman employed the new drug in the form of a 3 per cent solution to diminish the pain of urethral injections of albargin in **Gonorrhœa**. Lucke uses it for anæsthetizing the posterior urethra and the bladder. For the anterior urethra he injects 2–5–10 cc. of a 1 per cent solution. The injection is retained for ten minutes. To anæsthetize the posterior urethra he injects slowly from a Guyon's syringe 2–3 cc. of a 1 per cent novocaine solution, to which 6–10 drops of suprarenin solution 1–1000 has been added.

Liebl¹³ has tested on himself the toxic action of large doses. He injected into his own thigh 0.4 gram in 10 per cent solution, and as this produced no toxic symptoms he gave a further dose of 0.75 gram.

Even this only caused temporary inconvenience for an hour and a half. He concludes that a dose of 0.5 gram is not toxic for adults. In surgical work he found the new drug very valuable for **Operations on the Scalp** and head on account of its feeble toxicity.

Medullary Anæsthesia with novocaine has been performed by Sonnenberg, Opitz, Hermes, Krecke¹⁴. The general verdict is that it is a good anæsthetic for lumbar anæsthesia. After-effects were few, and consisted of headache and vomiting. The quantity of novocaine injected is 0.1 to 0.125 gram for perineal operations, 0.15 to 0.18 gram for laparotomies. Anæsthesia comes on in four minutes, and lasts from one to two hours or longer. Opitz recommends spinal anæsthesia with novocaine for gynæcological operations on old and feeble patients who cannot stand the strain of a prolonged general anæsthesia.

Spieß testifies that novocaine is useful in laryngeal work. For endolaryngeal operations he uses a ten per cent solution, of which 3 cc. is injected in three portions at intervals of three or four minutes.

REFERENCES.—¹*Med. Klin.* 1905, No. 48; ²*Deut. med. Woch.* 1905, No. 42; ³*Münch. med. Woch.* 1905, No. 46; ⁴*Ann. Policlin. Cent. de Brux.* Oct. 1905; ⁵*Deut. Monats. f. Zahnheilk.* April, 1906; ⁶*Leuthold Gedenkschr.* Bd. 11, 1906; ⁷*Deut. med. Woch.* 1906, No. 20; ⁸*Monats. f. Harn. u. Sex. Hyg.* 1906, No. 3; ⁹*Med. Klin.* 1906, No. 13; ¹⁰*Derm. Centralbl. Neuntes Jahrgang*, No. 8; ¹¹*Archiv. f. Augenh.* May, 1906; ¹²*Münch med. Woch.* 1906, No. 18; ¹³*Ibid.* 1906, No. 5; ¹⁴*Ibid.* 1906, No. 6.

NUCLEIC ACID.

Hannes¹ has tested the value of prophylactic injections of nucleic acid as a means of reducing the mortality after the radical operation for removing **Carcinomatous Uteri**.

Miyake² has shown that such injections caused a hyperleucocytosis, which proved of distinct value in protecting the individual against infection of the peritoneum with coli bacilli and other organisms in operations on the gastro-intestinal tract. Hannes makes the same claim for the injections in gynæcological operative work. His experience was obtained in a series of 51 cases of carcinoma uteri. In all these cases he injected subcutaneously 50 cc. of a 2 per cent solution of the sodium salt of nucleic acid. This injection was made about ten to sixteen hours before the operation, so that the actual operation might take place before the effect of injection had passed off. The reaction was striking. As a rule the temperature rose over 2° C., and in some cases there was headache. In 8 of the cases there was no rise in temperature: in almost all the count showed a great increase in the number of leucocytes in the peripheral blood. At the seat of the injection, in many cases there was swelling and redness, with some pain. Hannes concludes from careful analysis that the prophylactic injections did good, as in the fatal cases the peritonitic symptoms were much milder and more chronic than with his previous technique.

REFERENCES.—¹*Centr. f. Gyn.* 1906, No. 24; ²*Grenzgeb. d. Med. u. Chir.* Bd. xiii.

OIL (Subcutaneous use of).

Wyssotzki¹ reports two cases in which subcutaneous injection of oil proved of value when it was impossible to nourish the patient in any other way. In one case the injections were employed for twelve days, during which time 570 grams of oil were used. The dose varied from 20 to 80 grams, and caused no irritation. In the second case, under nutrient enemata, the patient was losing 6 lb. in nine days. On adding the subcutaneous use of oil this loss was reduced to 1 lb. per week. In this case twenty injections, representing 945 grams, were given. The injection was usually made into the flanks, and caused but little pain.

Some experiments of Henderson and Crofutt² do not appear to support this view. From experiments on animals they discovered that the oil was rapidly diffused through the subcutaneous tissues, but was not transferred *in situ* into adipose tissue. They could not discover the oil in the blood, lymph, or milk. Ultimately, no doubt, the oil is utilized, but the process is so slow that they do not think the injection can have any practical nutritive value.

REFERENCES.—¹*Russ. Med. Rundschau*, 1906, No. 6; ²*Amer. Jour. Phys.* Sept. 1905, in *Ther. Gaz.* Nov. 1905.

OSMIC ACID.

Eastman¹ uses injection of osmic acid in **Neuralgia**. Subcutaneous injection is of little use. The nerve requires to be exposed, and the drug directly injected into the nerve. In the case of small nerves it may be necessary to clip the nerves in order to bring the cut ends thoroughly into contact with the solution. Ten drops of a 2 per cent solution can safely be injected into the nerve, though kidney sufferers may show some signs of renal irritation. In a large proportion of cases distinct relief follows the injections. The relief is not immediate, and may require a couple of weeks to develop. Experiments on animals showed that the injection caused no change in the nerves except disintegration of the fat and oil globules in the perineural space and in the white matter of Schwann.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* Feb. 24, 1906.

PERMANGANATE OF POTASSIUM.

Schädel¹ recommends this drug as a hæmostat for all forms of **Parenchymatous Hæmorrhage**, e.g., after excision of warts, condylomata, lupus, and nasal hæmorrhage. It can be applied either in the form of a powder, mixed with charcoal 3-1, or, preferably, made into a paste with 4 per cent of vaselin. The bleeding part is carefully dried, and then the paste is pressed on the wound. It causes a slight burning sensation, which soon passes off.

REFERENCE.—¹*Deut. med. Woch.* Jan. 20, 1906.

PERU BALSAM.

This preparation is largely employed on the Continent as a remedy for **Scabies**. Periodically, cases of renal irritation occur, and show that the use of the drug is not wholly free from risk. Richarz¹ reports

a case in which three applications of a 10 per cent ointment was followed by nephritis, which ended in death from uræmic coma.

REFERENCE.—¹*Münch. med. Woch.* 1906, No. 19.

PHENYFORM.

This new antiseptic is intended as a **Dusting Powder**. It represents a polymerization product of the oxybenzyl alcohol, to which formaldehyde is bound in an easily split-off form. Phenyform is a light greyish white powder without taste or odour. It is insoluble in water, but dissolves in alcohol, ammonia, and acetone. The toxicity of the new substance has been investigated by Schuftan¹. He finds that for rabbits, dogs, and cats, the toxic action of the drug is practically nil. A rabbit weighing 2 kilos can receive 2 grams of the drug either by the mouth or subcutaneously in an olive-oil suspension without suffering any harm, while dogs and cats take 15 grams and 10 grams respectively with impunity.

REFERENCE.—¹*Ther. Monats.* May, 1906.

PICRIC ACID.

A saturated solution of picric acid is frequently applied in the treatment of **Burns**, and as a rule acts well. A case of poisoning, with severe constitutional disturbance, is reported by Elliot¹. After using the dressings for seven days, there was severe vomiting, fever, rapid pulse, and a rash resembling that of measles, absent from the face and hands, but well marked in those parts of the body in contact with each other or subjected to pressure. The urine contained an abnormal pigment, which could not be identified, but was not hæmatoporphyrin.

REFERENCE.—¹*Lancet*, April 28, 1906.

PROPONAL.

This substance was investigated some years ago by Fischer and von Mering, but they found that veronal was more satisfactory as a **Hypnotic**. More recent investigations¹ with a purer preparation show that proponal gives a reliable hypnotic action in doses of from 0.15 to 0.5 gram. It resembles veronal in being a colourless crystalline substance. The taste is slightly bitter, and is not unpleasant.

Mörchen² tested proponal in a series of asylum cases, and comes to the following conclusion: Proponal is a good hypnotic, resembling veronal in its effect. The dose required is somewhat smaller, but it acts promptly, and without any unpleasant side action. The one disadvantage that he finds is that the limit within which it is possible to push the drug is somewhat more restricted than with veronal. The veronal dose is roughly about double that of proponal, the normal dose of which should not exceed $7\frac{1}{2}$ gr. The patient falls asleep in half an hour, and after some hours' sleep wakes up without any mental confusion or headache. With repeated administration, the action of the drug rapidly weakens, and frequent interruptions require to be made. He considers that the chief use of the new drug will be

in temporarily replacing veronal when the patient is becoming accustomed to the action of the latter drug.

Kalischer³ finds that proponal leaves fewer after-effects than veronal. There is no giddiness or somnolent effect on the succeeding day. He did not find any tolerance, even after steady use for weeks. It has no influence on pain. He considers it a useful variant or substitute for other hypnotics.

Lilienfeld⁴ finds that sleep occurs rapidly, lasts six to nine hours, and is more free from dreams than that induced by veronal. Next morning there is a slight feeling of lassitude.

REFERENCES.—¹*Pharm. Post* 1906, No. 1; ²*Münch. med. Woch.* 1906, No. 16; ³*Neurol. Centr.* Mar. 1, 1906; ⁴*Berl. klin. Woch.* 1906, No. 10.

PROTYLIN.

This is a new organic phosphorus combination in which the phosphorus is introduced into the albumin molecule in the form of an anhydride. Protylin contains about 75 per cent of albumin and 2·5 per cent of phosphorus. Neumann¹ has carried out some metabolism experiments with this preparation. A certain proportion of the nitrogen of the diet, as well as phosphorus, can be replaced by an aliquot amount of protylin, without disturbing the nitrogen and phosphorus equilibrium. If protylin is given in addition to an ordinary full diet, the patients retain nitrogen and phosphorus in their tissues. He therefore concludes that the tissues are able to utilize the albumin and phosphorus for building up cellular elements.

Gallenga² is favourably impressed by this preparation. It is easily borne by the stomach, and is not toxic. As a proof that the drug is absorbed, he points out that its administration increases the urinary phosphorus, while the fæcal phosphorus remains unchanged.

REFERENCES.—¹*Münch. med. Woch.* 1906, No. 32; ²*Il Policl.* March and April, 1906.

QUININE.

Binz¹, since 1868, has taught that quinine cures **Whooping Cough**. The difficulty lay in getting the children to take the bitter drug. To some extent this is avoided by using the newer tasteless preparations, euchinin and aristochin. In using the drug he commences with a small dose, and gradually increases it till the child is taking twice daily 3 gr. for each year of age, or in infants $\frac{1}{3}$ gr. for each month; but as a rule a child does not require a higher dose than 22 gr. in the day, or an infant more than $1\frac{1}{2}$ gr. Under such doses the attacks rapidly diminish in number and severity. Koppe² recommends aristochin, at first one or two doses daily, but raising this number gradually to four or five, giving at each dose 3–4 gr. for an infant and $7\frac{1}{2}$ gr. for a child.

Malafosse³ states that the injection of a solution of the quinine bichlorate in artificial saline solution is not painful. The strength of quinine is 0·2 per cent, and this necessitates the injection of large

amounts of fluid. According to Hirtz¹, quinine formate makes a suitable preparation for hypodermic use. Three grains dissolved in 30 drops of water do not irritate and cause no pain.

REFERENCES.—¹*Berl. klin. Woch.* 1906, No. 15; ²*Deut. Aerzte Ztg.* 1905, No. 9; ³*Sem. Méd.* 1905, No. 18; ⁴*Ibid.* Jan. 19, 1906.

RECTAL ALIMENTATION.

Boyd and Robertson¹ carried out a series of observations on six patients suffering from gastric ulcer during a period in which complete gastric rest was required. Enemata, consisting of white of egg, dextrose, milk, and sodium chloride, were used. When eggs were given, the whole enema was pancreatized. The proteid value of the food was estimated beforehand, and then, from observation, the total nitrogen excretion of the bowels and kidneys was determined. The conclusions come to were as follows:—

1. Proteid food, even when predigested and with salt added, is very poorly absorbed; the albumen of eggs as generally used in rectal feeding is an expensive and unsatisfactory food-stuff. There is no relation between the amounts injected and absorbed, which latter seems to depend more on the patient's individual capacity than on the amount given.

2. Fat absorption seems to play an important part as a nitrogen saver; the loss of tissue nitrogen is much larger in cases where fat absorption is poor. These observations show that emulsified fat is a very useful ingredient of rectal enemata, and is very much better absorbed than is generally considered.

3. The addition of intestinal bacteria to dextrose solution *in vitro* shows that the amount lost by bacterial action is small. In all cases, absorption of dextrose seems to be good, and varies with the capacity of the individual rather than with the amount given. The irritation usually ascribed to sugar is probably due to impurity. Pure dextrose, the most satisfactory form, is non-irritant; it is, however, somewhat expensive.

4. Even if a reduced standard of nutritive requirements is accepted, only about one quarter of the nourishment required by man to maintain equilibrium can be obtained from enemata.

REFERENCE.—¹*Scot. Med. and Surg. Jour.* Mar., 1906.

SAIODIN.

Von Mering and Emil Fischer¹ describe a new iodine preparation, which is in some respects superior to iodipin. They investigated the series of salts of the higher monoiodo fatty acids, and found them tasteless and insoluble in water. The calcium salt of the monoiodo behenic acid is readily obtainable in a pure condition. Its chemical formula is $(C_{22}H_{42}O_2I)_2Ca$. Colourless, tasteless, and odourless, it contains 26 per cent of iodine, or about three times less iodine than potassium iodide. It keeps well if protected from light, but turns slightly yellow if exposed to it, without, however, decomposing. As a substitute for iodine it has been put upon the

market under the trade name of saiodin. It is claimed that it produces no gastro-intestinal disturbance when taken internally, and does not give rise to symptoms of iodism. Several highly favourable clinical reports have been already published, which go to prove that, despite the smaller quantity of iodine that it contains, saiodin is as efficacious as potassium iodide in therapeutic activity.

Roscher² has used it in 39 cases of **Syphilis** and **Arteriosclerosis**, and finds that the drug is well borne, acts promptly and efficiently, while even in patients markedly susceptible to iodism it produces only a minimal reaction. Mayer³ reports that the drug acted well in a series of 100 cases of syphilis. Patients of all ages took it readily, and no unpleasant side-effects were observed. Lublinski⁴ is satisfied with its action in a limited number of cases in which he has tried it. They represented syphilitic affections, **Bronchitis**, and arteriosclerosis.

By Junker⁵ it has been thoroughly tested in various diseased conditions in which it is customary to administer iodides. Thus, he has used it in secondary and tertiary syphilis, arteriosclerosis, **Gout**, chronic **Bronchitis**, **Lead Poisoning**, and chronic **Joint Affections**. The dose ranged from about 20–45 gr. per diem. He finds that an iodine action is readily obtained. The drug is without taste, and patients appreciate this after previous experience of potassium iodide. The symptoms of iodism are very slight. The appetite is not affected, and even in patients suffering from gastric irritability it caused no disturbance. The therapeutic results were fully as good as one is accustomed to obtain with administration of iodides.

REFERENCES.—¹*Med. Chir.* 1906, No. 7; ²*Med. Klin.* 1906, No. 7; ³*Dermat. Zeits.* 1906, Hft. 3; ⁴*Ther. Monats.* June, 1906; ⁵*Münch. med. W'och.* 1906, No. 35.

SALICYLATE OF SODIUM.

Clark¹ advocates the administration of massive doses in **Acute Rheumatism**. He gives 10–20 gr. every hour till toxic symptoms—tinnitus and deafness—appear. The drug is then stopped till these toxic manifestations pass off, when it is commenced again, 10–20 grs. every two to four hours, stopping again on each recurrence of toxic manifestations. The amount of the drug required to produce these symptoms varies, but on an average 200 gr. is well borne. These massive doses do not cause nausea, vomiting, or cardiac depression, and the relief of pain and swelling is more prompt than with the ordinary dosage. The temperature, on an average, is sub-normal within 36 hours. The average patient is free from pain on the fourth day. The incidence of cardiac complications is lessened. The swelling of the joints disappears about the third day. With proper care and observation there is no real danger in using these doses in adults. A certain diagnostic value is attached to them; thus, patients suffering from other forms of arthritis do not stand the drug so well, manifest toxic symptoms with smaller amounts, and the relief of pain, etc., is not marked.

Langmead² reports a series of eight cases, in which administration

of sodium salicylate to children was followed by poisoning. The symptoms were fairly constant, and consisted essentially of acetonuria, air hunger, drowsiness deepening into coma and, if untreated, ending in death; the child is flushed, the eyes are bright, and there is great thirst. Vomiting usually, but not always, precedes these symptoms. The drowsiness may replace, or be associated with, delirium. There is a sweet odour of acetone on the breath, and generally the clinical picture closely resembles that of diabetic coma. In many cases the bowels remained obstinately constipated. From an analysis of the cases, it appears that the amount of the drug required to produce these symptoms varies much in the different cases. He is inclined to look upon the condition as one of acid intoxication, and therefore gives large doses of the bicarbonate of sodium as a prophylactic and remedial measure. Very large doses of alkali are required to neutralize the urine of patients taking salicylate. In three of his cases, though the amount of alkali given was double that of the salicylate, symptoms of poisoning came on. He concluded that salicylate of sodium should be carefully given, as the toxic dose is variable, depending upon the idiosyncrasy of the patient, and the absence or presence of constipation. Acetone may be detected in the urine at an early stage of the poisoning, and its presence constitutes a valuable danger signal. In using the salicylate, the patient's bowels should be kept open, and the acidity of the urine must be kept low. If acetone is found, and the urine becomes more and more acid, the salicylates should be omitted, and the alkali should be given alone. The same toxic symptoms have been observed after the use of aspirin.

Darrier³ has had good results in rheumatic **Iritis**, from the intravenous injection of sodium salicylate. He employs Mendel's formula: sodium salicylate 5 grams, Caffeine 0.5 grams, distilled water 25 grams. The daily dose is 2-3 cc., or double this amount thrice weekly. The relief of pain is very rapidly obtained.

REFERENCES.—¹*Jour. Amer. Med. Sci.* Sept. 1906; ²*Lancet*, June 30, 1906; ³*Sem. Méd.* Mar. 28, 1906.

SALIMENTHOL.

This is a tasteless fluid, but of pleasant odour, prepared from salicylic acid and menthol. Chemically it is a salicylic acid ester of menthol. It is administered internally in the form of capsules containing 4 drops, or externally as a 25 per cent ointment. Reicher¹ finds the drug a useful sedative in **Toothache**, and the combined local and internal administration gives prompt relief in muscular and articular **Rheumatism**.

REFERENCE.—¹*Ther. Monats.* June 1906.

SANTONIN.

Santonin seems to have some action on the respiratory action. It is used by the natives of Tashkend in the treatment of **Phthisis**.

Tollens¹ finds that the drug lowers the temperature, increases leucocytosis, and affects the respiratory movements, reducing them in

number, but rendering them more ample. Collet² reports a case of **Laryngeal Spasm** in Locomotor Ataxia, which was cured by administering 15 cgrams of santonin thrice daily. The drug was continued for nearly two months without inconvenience, and during this time there was freedom from the laryngeal crises: after stopping the drug they returned, but were again controlled on recommencing the santonin.

REFERENCES.—¹*Pract. Dec.* 1906; ²*Ann. des Mal. de l'Oreille, Larynx, etc.* Sept. 1905.

SARSAPARILLA.

Several writers in the *British Medical Journal* have tried to rescue this drug from the disrepute into which it has fallen, as a remedy for **Syphilitic Cachexia**. The discussion was started by Semon¹, who expressed his belief in large doses in syphilitic cachexia. Allbutt² points out that very much larger doses of the decoction are required than are usually administered. He finds that one to two pints are required in the day. Certain of the older clinical teachers in the Leeds School of Medicine have obtained good results with these large doses. Sir Dyce Duckworth³ also agrees that the ordinary doses of the official preparation are useless. He has for years advocated the use of a concentrated compound decoction, which, if taken for some weeks in $\frac{1}{2}$ –1 oz. doses well diluted several times a day, is a remarkable remedy in improving nutrition and restoring health. Cullingworth⁴, in an interesting contribution on the same subject, publishes a number of observations made many years ago on the therapeutic value of sarsaparilla in **Syphilis**. He employed a syrup of sarsaparilla, which was given in 4-oz. doses thrice daily. His notes show that, under the sarsaparilla treatment, the patients uniformly gained in weight, and that the gain was greater than under other forms of treatment.

REFERENCES.—¹*Brit. Med. Jour.* Jan. 13, 1906; ²*Ibid.* Mar. 24, 1906; ³*Ibid.* Mar. 31, 1906; ⁴*Ibid.* April 17, 1906.

SCOPOLAMINE HYDROBROMIDE.

This preparation, though known for a number of years, has been introduced into and made official in the United States Pharmacopœia for the first time in the 1905 edition. Shoemaker¹ points out that chemically the drug is identical with hyoscine hydrobromide. It is important to note that commercial scopolamine hydrobromide contains an admixture of another powerful alkaloid, atropine, isomeric with hyoscine, and consequently the commercial scopolamine may vary in its action owing to the variable quantity of atropine present.

Chollet² finds that the injection of $\frac{1}{2}$ –1½ mgram ($\frac{1}{128}$ – $\frac{1}{12}$ gr.) exercised a rapid hypnotic effect upon all cases of **Insomnia** due to mental agitation. The patient goes to sleep within ten to twenty minutes after the injection, and sleeps for from five to eight hours. Next day a slight sedative effect is seen. Brelet³, in discussing this paper, points out that the treatment is not free from risk, since the drug exerts a toxic action on the myocardium and respiratory centres.

Several writers have used this drug to relieve the **Pains of Labour**. Laurendeau⁴ gave $\frac{1}{50}$ gr. of scopolamine hydrobromide along with $\frac{1}{5}$ gr. of morphia sulph. hypodermically in a series of 15 cases. The results, as far as the mother was concerned, were good. No complication arose, but possibly the period of expulsion was prolonged more than usual. On the other hand, the children, in many instances, were affected. In one out of four artificial respiration was required, and the pupils were slightly dilated.

The use of scopolamine and morphia to alleviate the pains of labour has been extensively tried in Germany. The most elaborate reports are those of Gauss and Hocheisen⁵. The former has used the procedure in 300 and the latter in 100 cases. Gauss in particular is very much taken with the method, but Hocheisen is by no means so enthusiastic. He agrees with Gauss that by means of the two alkaloids it is possible, in the great majority of cases, to lessen the pains of labour, but he points out that scopolamine is a dangerous drug, and that the individual reaction to it is very varying. Thus, in 60 per cent of his cases, great congestion of the face followed, which often looked alarming, and in a few cases resulted in epistaxis. Excessive thirst was not uncommon, and occasionally excitement and delirium were noted. These actions, of course, are extremely unpleasant for the friends, especially if the doctor has had to leave his patient. The strength of the uterine contraction was lessened in a few cases, and in 25 per cent he found that the abdominal wall action was diminished, and the birth was protracted. In the third stage of labour he thinks that the effect of the injection is unfavourable. The patient needs to be watched, and the uterus requires frequently to be massaged to induce adequate contractions. Special care must be taken when the heart or kidneys are diseased. It is often the case that for some minutes after the child is born its breathing is irregular and very infrequent; this state may be due to the action of the morphia, and as a rule passes off.

REFERENCES.—¹*New York Med. Jour.* Oct. 7, 1905; ²*Thèse de Paris*, 1905, in *New York Med. Jour.* Feb. 24, 1906; ³*Arch. Gén. de Méd.* Jan. 2, 1906; ⁴*L'Union Méd.* Vol. 13, No. 1, in *Ther. Gaz.* Mar. 15, 1906; ⁵*Munch. med. Woch.* 1906, Nos. 37, 38.

SILVER COMPOUNDS.

Marshall and Neave¹ have investigated the bactericidal action of various compounds of silver which are in common use. The following table shows the percentage of silver contained:—

Percentage of Ag.		Percentage of Ag.	
Collargol ..	86.6	Albargin ..	13.4
Silver fluoride ..	81.7	Nargol ..	9.6
Silver nitrate ..	63.6	Largin ..	9.4
Itrol ..	60.8	Novargan ..	7.9
Actol ..	51.5	Protargol ..	7.4
Argentol ..	31.2	Argentamin ..	6.4
Ichthargan ..	27.1	Argonin ..	3.8
Argyrol ..	20.0		

These results were used in preparing the various solutions. Each solution was made to contain a definite percentage of silver. The bactericidal action was tested on a mixed culture and on a pure culture of *Staphylococcus pyogenes aureus*. The mixed culture was obtained by allowing uncooked meat to stand in water for from four to six weeks. It was strained just previous to use, and contained both chlorides and albumin. The staphylococcus was used in the ordinary form of inoculated threads. The antiseptic action was determined by observing the time taken for minced cooked meat to putrefy in the presence of solutions of silver compounds of known strength, and by inoculating an agar medium containing a definite quantity of the various silver salts. Lastly, as the therapeutic value depends to a large extent on their power of diffusion, an attempt was made to estimate this by a series of experiments in which glass tubes of standard length and bore were filled with nutrient agar previously inoculated with *Staphylococcus pyogenes albus*. The tubes were then placed horizontally in the solutions, and after twenty-four hours were examined.

The general result of the experiments is as follows: As regards bactericidal action, the various silver compounds investigated fall into three groups: (1) Those which are powerfully bactericidal; (2) One—nargol—much less powerfully bactericidal; (3) Two—argyrol and collargol—which possess practically no bactericidal action whatever. The first group includes most of the substances investigated, namely, silver nitrate, silver fluoride, actol, itrol, argentamin, argentol, albargin, argonin, ichthargan, largin, novargan, and protargol. The bactericidal action of these, in solutions containing the same percentage of combined silver, is closely similar, and it is practically impossible to place them in any order of activity which would be true under all circumstances. As argyrol and collargol are not bactericidal, it is evident that the amount of silver which a compound may contain is no criterion of its bactericidal power. Moreover, in view of the results obtained with argyrol, it seems impossible to attribute the good effects which many clinicians have obtained with it to its bactericidal action.

REFERENCE.—¹*Brit. Med. Jour.* Aug. 18, 1906.

SODIUM FLUORIDE.

According to Tuffier¹, this preparation is a powerful antiseptic, which possesses the special property of liquefying the tenacious secretions of certain forms of **Cystitis**. In this disease, irrigation every second day with solutions containing $\frac{1}{4}$ – $\frac{1}{2}$ per cent of sodium fluoride is satisfactory.

REFERENCE.—¹*Jour. de Méd. de Paris*, Dec. 24, 1905.

SODIUM SILICATE.

Zinkgraf¹ administered 1 gram daily, and found that the drug was absorbed, as the excretion of silicate in the urine was doubled. The drug causes a slight diminution, rapidly followed by an increase, in the number of leucocytes in the peripheral circulation.

Clinically the drug was tested in **Tuberculosis**: under its action the course of the disease was favourably influenced, elastic fibres and bacilli tend to disappear from the sputum, and the patients put on weight. The silicate takes an active part in the process of calcareous transformation of tuberculous tissue.

REFERENCE.—¹*Beitr. z. Klin. der Tuberkul.* 1906, Bd. 5, Hft. 4.

SPARTEINE.

Petty¹ holds that this is a very valuable cardiac tonic if used in sufficient dose. He complains that the official dose is much too small. Two grains by the mouth or $1\frac{1}{2}$ gr. hypodermically is about the proper amount: it acts promptly and efficiently in overcoming **Cardiac Irregularity**. It should be given in an initial dose of 2 gr., and this should be repeated in two or three hours. Thereafter, a dose every four to six hours is sufficient. He finds it very valuable in **Pneumonia**.

REFERENCE.—¹*Ther. Gaz.* Mar. 1906.

SPINAL ANÆSTHESIA.

Spinal anæsthesia has hitherto been used almost entirely by surgeons, but Lazarus points out that it is of service in certain cases for enabling physicians to treat medical conditions. In spinal anæsthesia, not only is sensation abolished, but there is very complete muscular relaxation. It is, therefore, a very suitable anæsthesia for passive nerve stretching, as in sciatica, or for breaking down adhesions in stiffened joints. In certain spinal conditions attended with pain or motor spasms, spinal anæsthesia has proved more satisfactory than any other method of treatment. Lazarus¹ has used it in the painful crises of **Locomotor Ataxia**, in the exaggerated twitching of **Disseminated Sclerosis**, and in a case of painful **Paraplegia** from cancer of the spine. In such cases the benefit is only temporary. Lastly, it may be useful in the differentiation of **Hysterical Contractures**, and to facilitate palpation of the abdomen; Löhrer² recommends it in hysterical contractures of the lower extremities.

REFERENCES.—¹*Zeits. f. Diat. u. Phys. Ther.* May, 1906; ²*Münch. med. Woch.* 1906, No. 32.

STOVAINE.

With the more general use of the spinal injection of stovaine, several accidents have come as reminders that the method is not without danger. König records a case in which the injection of 0.06 gram of stovaine was followed by permanent paralysis of the spinal cord. The patient was completely paralyzed from the navel downwards, and the bladder and rectum were involved. A lumbar puncture, carried out on the seventh day after the injection and repeated on the twelfth day, showed that there was no meningitis, and that the cerebrospinal fluid was sterile. The patient developed bedsores and cystitis, and died three months later. Post mortem there was some adhesion of the dura and softening of the cord.

Roeder¹ reports two cases in which, some days after the spinal injection of stovaine, paralysis of the abductor muscle of the eye was noted; in both, the paralysis supervened on the twelfth day. There was no history of any other cause, and Roeder attributes it to the stovaine. Adam had a similar case, but considers the paralysis due to a minute hæmorrhage in the nucleus caused by the alteration in pressure from removal of the cerebrospinal fluid.

Greiffenhagen² has twice observed serious respiratory disturbance to follow spinal injection of stovaine. The doses employed were 0.04 and 0.06 gram, and for fifteen to twenty minutes artificial respiration was required. This experience shows that it is not safe to use spinal anaesthesia unless some assistance is available.

Trautenroth³ records a serious condition in a patient after an injection of 0.06 gram of stovaine. Within ten minutes there was complaint of suffocation, with weakness of the circulation and respiration. Subsequently, there was unconsciousness, which passed off under camphor injections, paralysis of both legs, and muscular relaxation. For three days severe headache persisted, and fourteen days afterwards a local meningitis and neuritis came on, and confined the patient to bed for five weeks.

Finkelnburg⁴ has carefully observed 50 cases of spinal anaesthesia induced by intraspinal injection of stovaine in the surgical clinique in Bonn. The technique is as follows: With the patient in the sitting position the needle is introduced in the middle line between the first and second, or the second and third, lumbar vertebræ. No trocar is used. Several syringefuls of cerebrospinal fluid are removed, and then 0.04–0.06 gram stovaine, mixed with 0.11 per cent of sodium chloride and 0.01 per cent adrenalin, is injected. According to the nature of the operation the patient is then laid horizontally, or the pelvis is raised. It is necessary to introduce the needle accurately in the middle line, as deviation to either side may lead to a one-sided anaesthesia owing to interference with the diffusion of the drug. If the injection is properly carried out, there should be no pain apart from the introduction of the needle. The development of anaesthesia is as follows:—

At the end of the first minute, with the patient in the horizontal position, the first symptom is a slight diminution in the sensitiveness of the scrotum to pain. This spreads to the inner surface of the thighs and anal region. Tactile sensation and power of localization are at first retained. Almost simultaneously there is a distinct weakening or even abolition of the knee-jerk: if this comes on within one minute, it may be taken as an absolute indication that the anaesthesia will be satisfactory. The Achilles tendon reflex disappears in the second minute. If the pelvis has been raised, the analgesia has usually spread up to the navel. At this stage, neither tactile sensation, thermal sensitiveness, nor power of localization is affected to any marked degree; they are implicated relatively late during the fifth minute. The cutaneous reflexes disappear from the

fourth to the fifth minute. The abdominal reflex persists after the disappearance of the plantar reflex. From the fourth to the sixth minute some motor disturbance appears, shown first in slight difficulty in moving the toes and feet. Almost concomitant with the paresis of the legs, weakness of the abdominal muscles is seen, so that the patient is unable to raise himself from the dorsal position without the aid of his arms. At the end of five minutes there is complete analgesia of the legs and body up to the level of the fifth and sixth ribs. Tactile sensibility is usually much affected, as are also the appreciation of temperature and localization, but the power of judging the position of the limbs persists longer, and may be but little affected. The deeper structures supplied by the sacral nerves are analgesic; on the other hand, it is difficult to obtain a satisfactory analgesia of the scrotum and spermatic cord, as their nerve supply comes from the genitocrural nerve; the same holds true for the peritoneum. The duration of anæsthesia varies. Sensation commences to return after forty-five to sixty minutes, occurring much more slowly than the abolition. Firstly motion, then sensation, finally the reflex action reappear. The action of the drug must be most intense upon spinal nerve tracts; thus the reflex arc is more sensitive than the motor and sensory tracts, while there are distinct differences in the implication of the various sensory systems. After-effects were not commonly noted; occasionally there is a period of increased reflex activity. In other cases, slowing of the pulse was noted, coming on in about $\frac{1}{2}$ – $\frac{3}{4}$ hour after the injection and lasting for a couple of hours. The blood-pressure is not affected, but the temperature may be raised for a few days afterwards.

REFERENCES.—¹*Münch. med. Woch.* 1906, No. 23; ²*Zeits. f. Chir.* 1906, No. 19; ³*Deut. med. Woch.* 1906, No. 7; ⁴*Münch. med. Woch.* 1906, No. 9.

THEPHORIN.

This new diuretic is a double salt analogous to diuretin, but in which the theobromine is combined with sodium formate in place of sodium salicylate. Thephorin is fairly soluble, and readily forms 10 per cent solutions. Maas¹ has investigated the pharmacological action, and finds that the drug exerts comparatively little toxic action. The lethal dose for guinea-pigs is 0.8–0.9 gram per kilo body-weight, and the toxic action depends entirely upon its content of theobromine. The general effect of small doses seems to be stimulation, but with large or lethal doses there is depression and general paralysis. It depresses the circulation slightly, but increases the pulse-rate. The diuresis of healthy animals is temporarily enormously increased, but not the total quantity of urine passed in twenty-four hours. In certain artificially produced renal conditions the new drug proved to be a powerful means of removing **Dropsy**. The therapeutically active dose is much smaller than the toxic dose.

REFERENCE.—¹*Ther. Monats.* April, 1906.

THIGENOL.

This substance is an oleo-sulphonate of sodium. Mazzini¹ states that it is odourless, soluble in water and glycerin, and does not stain linen. He finds it superior to other sulphur preparations for **Dermatological** purposes, as it is clean, easily applied, and sedative in its effect. He employs the following formula: thigenol, 5 parts; olive oil and glycerin, of each 25 parts.

Tubini² uses a glycerinated solution of 10–20 per cent in **Gynæcological** practice. He finds it superior to ichthyol for routine use. It is not irritant, and has a resolving and sedative action.

Delaunay³ is another enthusiast about this drug. He finds it gives excellent results in gynæcological work; it relieves congestive states, and as such is useful in **Catarrhal Metritis** and in **Metrorrhagia**, while it is an excellent topical application for **Ulcerated Wounds of the Cervix**.

REFERENCES.—¹*Gaz. Internaz. di Med.* 1906, No. 8; ²*Il Progresso Medico*, 1906, No. 1; ³*Presse Méd.* Mar. 14, 1906.

THIOSINAMINE (See FIBROLYSIN).**UROTROPIN.**

Easton¹ has tested the effect of urotropin in **Typhoid Fever** at the Massachusetts General Hospital. During one year every typhoid patient was given the drug daily. As soon as convalescence was established it was stopped, and examination six to ten days afterwards of 46 cases showed that the urine was clear and developed no growth. Altogether, 486 patients were given urotropin, as a rule in doses of 8–10 gr. thrice daily. There were three cases of painful micturition, two of hæmaturia, and in several cases a few red blood cells appeared in the urine, but they all cleared up on stopping the drug for a few days. The moderate use of urotropin during the course of the disease prevents cystitis and other genito-urinary complications, and, by making the urine innocuous, makes the early discharge of convalescent patients harmless to the community.

Buttersack² also advocates the prolonged administration of urotropin as a prophylactic measure to prevent the development of **Nephritis in Scarlet Fever**. Nephritis as a rule develops between the twenty-first and twenty-fifth day of the disease, and previous writers have advocated an intermittent administration for periods of three or four days at a time, but Buttersack points out that urotropin is rapidly excreted, and advocates its administration continuously up to the twenty-first or twenty-fifth day. In a series of thirty-four cases treated on this plan he had no instance of nephritis, though in a few cases a trace of albumin suddenly appeared, with a few hyaline and epithelial casts, but without œdema, or alteration in the quantity or appearance of the urine.

REFERENCES.—¹*Bost. Med. and Surg. Jour.* 1905, No. 7; ²*Med. Correspbl. d. Württem. arzt. Ver.* Oct. 14, 1905.

VACCINATION.

Kraus and Volk¹ have studied the process of vaccination on monkeys. Cutaneous vaccination causes immunity of the skin, but not of the cornea. Thus there may be cutaneous immunity along with susceptibility of other tissues. For the actual development of immunity the formation of the pustule is not essential, since immunity develops even if the inoculated skin is excised on the first signs of irritation and redness. Further, they were able to show that the subcutaneous injection of 2 cc. of a solution of lymph diluted 1-500 or 1-1000 produces skin immunity in apes.

Nobl² attempted to trace the development of the immunity by means of successive inoculations at intervals up to 10 days. He finds that such subsequent inoculations were uniformly successful. The vaccine pustule seems to be a purely local process, which has little to do with the saturating of the system with the vaccine immunizing body.

In a critical article, Löwenbein³ concludes that in the blood of vaccinated animals, substances are present which, when brought into contact with fresh lymph, are able to weaken or even neutralize its action. These substances are present in greater quantity after repeated subcutaneous injection of lymph than after the ordinary procedure of cutaneous inoculation. In the latter case they appear during the subsidence of the pustules, and disappear after a varying period. The attempts to confer immunity to vaccination by injecting the serum of vaccinated animals proved unsuccessful.

REFERENCES.—¹*Wien. klin. Woch.* 1906, No. 21; ²*Ibid.* 1906, No. 22; ³*Centr. f. ges. Ther.* Feb. 1906.

VALYL.

Knopf¹ has found a new field for valyl, a valerianic-acid-diethylamide which is said to represent the activity of valerian preparations. He has used valyl in **Symptomatic Singing in the Ears**, and finds that it is by far the best remedy he knows for alleviating this disturbing symptom of otosclerosis. He uses capsules containing 0.125 gram. of which from three to nine are given daily. If the drug is going to act it acts rapidly, and it is useless to persevere with it if no improvement is obtained in eight days.

REFERENCE.—¹*Ther. Monats.* Feb. 1906.

VERONAL.

Combemale¹ has found a new property of this drug. According to him it is an excellent antispasmodic, relieving the severe and painful contraction of amyotrophic lateral sclerosis in a remarkable manner. He also obtained excellent results in the tremor of **Disseminated Sclerosis, Hemiplegia, Neurasthenia, and Cerebral Tumour**. The dose he finds suitable is 7½ grams every evening, and he administers this for several weeks.

Quite a number of cases of poisoning with this drug have been

reported in the past year. Held² records the case of a woman who took 9 grams with suicidal intent. The stupor induced was profound, and on the following day convulsions came on, and an eruption of blisters about the fingers developed. In four days the patient had recovered almost completely, and the only complaint was of pain in the nape of the neck. Mörchen³ puts upon record a similar case. A woman, who was suffering from mental depression, took a number of tabloids, representing 8-10 grams veronal, 5-6 grams sulphonal and trional.

Geiringer⁴ reports a case in which a neurasthenic patient took at one dose 4.5 grams in powder form. She fell into a deep sleep, and on the following morning awoke with nausea and vomiting. She was in a dazed condition, and complained of swimming of the head, sleepiness, and staggering gait. During the course of the day there was repeated vomiting, but by the following morning she was all right again. Less serious was a case of erythematous rash, which occurred in a case of Wills⁵. Following a single dose of 8 gr., a lady, who had previously shown a liability to drug erythema, came out in a violent erythematous rash, with marked burning sensation and swelling of the face. The skin peeled from the fourth day onwards.

These cases show that comparatively large doses can be swallowed without doing any permanent injury; but several fatal cases of poisoning are also published. Farncomb's case⁶ was that of a gentleman who had been using the drug for a couple of months. After a sleepless night he took a dose in the morning, and, as this proved ineffectual, repeated it in the afternoon. The amount taken was not known. In the evening he was found unconscious; on the following day he could be partially roused, but the stuporous condition returned, signs of consolidation appeared, and death took place on the succeeding day. In this case it is not quite clear how much was due to the drug, and how much resulted from the pneumonic conditions. Harnack⁷ reports a case, which is also a little questionable, in which a man, ætat. 50, was ordered to take 5.5 grams of ext. filicis liq. and 10 grams of kamala. Unfortunately, instead of kamala, veronal was dispensed. Shortly after the patient became unconscious, and could not be roused: the face was red, the skin clammy, and the pupils contracted but reacting. On the second day the reflexes diminished, but the stuporous condition persisted, and death occurred on the following evening, i.e., sixty-five hours after swallowing the drug. It is possible that the filix mas may have contributed to the fatal result. Ehrlich⁸ subsequently reported two fatal cases. In the first a man, ætat. 57, swallowed 1 oz. of veronal. The action resembled that of profound morphine poisoning: there was coma, with cyanosis and shallow breathing, the respiration ceased every now and then, pupils were contracted and did not react. The patient died in twenty hours, without regaining consciousness. In the second case 11 grams caused death in twenty hours.

REFERENCES.—¹*Deut. med. Ztg.* 1906, No. 14; ²*Trib. Med.* April 25,

1905; ³*Ther. Monats.* April 1906; ⁴*Wien. klin. Woch.* 1905, No. 47; ⁵*Brit. Med. Jour.* Mar. 3, 1906; ⁶*Canad. Pract.* Dec. 1905; ⁷*Münch. med. Woch.* 1905, No. 47; ⁸*Ibid.* 1906, No. 12.

YIFERRAL.

Wittheuer and Gaertner¹, in reporting on this new **Hypnotic**, state that it is a compound of anhydrous chloral and pyridin. It occurs as a white powder, bitter in taste, slowly soluble in cold, but more rapidly in hot water. In ordinary doses (15 gr.) it induces sound refreshing sleep, from which the patient awakes without any unpleasant after-effect, except an occasional slight headache. With continued use, a tolerance may become established.

Mackh² reports a limited number of observations with this drug. As a rule 15 gr. act well, except in the presence of pain or severe fever. The drug does not depress the heart, lungs, or kidneys, and patients almost never suffer from drowsiness or headache on the following day.

REFERENCES.—¹*Ther. Monats.* 1905, No. 3; ²*Münch. med. Woch.* 1906, No. 31.

ZINC CHLORIDE.

Zinc chloride is usually supposed to possess considerable power as an antiseptic, but according to the researches of M'Clintic¹, it possesses little value as an antiseptic: the spores of *Bacillus subtilis* were not killed by a 100 per cent solution in thirty days, while it required thirty minutes' exposure in a 25 per cent solution to kill the *Staphylococcus pyogenes aureus*. Neither is it particularly valuable as a deodorant, since it must be used in the proportion of at least 1-200 or 1-500. It follows that zinc chloride should not be used for sterilizing typhoid stools.

REFERENCE.—¹*Ther. Gaz.* July 4, 1906.

SERUM-THERAPEUTICS.

THE ordinary method of administering serum is by means of hypodermic or intravenous injections. Certain disadvantages arise from these injections, and attempts have been made to administer the serum by other channels. Fenwick and Parkinson¹ obtained the beneficial action of antistreptococcic serum when made use of in cases of **Gonorrhœa** and **Purpura**. Similarly, Nathan Raw² employed antistreptococcic serum successfully in two cases of **Malignant Endocarditis**. The dose employed was 20 cc., and Raw mixes this with double the quantity of saline solution, and injects the mixture into the rectum night and morning. The serum causes no discomfort, is rapidly absorbed, and exerts the same antibactericidal action as when administered by the skin. Pilcher has the greatest confidence in the oral administration of diphtheria antitoxin, provided that there is no violent urgency present at the time. The stomach must be empty, and there must be an absence of vomiting. To avoid

the unpleasant cutaneous manifestations which follow the subcutaneous use of Marmorek's serum in emaciated patients, several recent writers recommend as preferable the employment of rectal injections of the serum. The therapeutic action is said to be obtained with a minimum of discomfort.

Paton³ has obtained remarkable results from the administration of serum (both normal and the product of immunity) by the mouth. The action is neither bactericidal nor antitoxic, but probably arises from the fact that the resisting power of the tissues is so increased that foreign organisms are incapable of further affecting them. He defines health as the power of the tissues to carry on their functions unimpaired in the presence of infection. By administering the normal plasma of an animal refractory to a certain disease, the patient acquires a degree of passive immunity. In diphtheria, the oral administration of 1 dr. of the serum along with the hypodermic use, materially assists the recuperative power of the patient.

Wright⁴ points out that at the present time the antitoxic sera are manufactured too much by rule of thumb. In many cases the resulting serum by no means conforms to the claims made by the manufacturer. He has found antitoxic sera which were themselves directly toxic, or which, on injection, lowered the resisting power to the disease in question. The whole question of serum-therapy, except where it is one of the direct neutralization of a poison as in diphtheria, rests upon insecure foundations. The manufacturer does not really possess a competent knowledge of his serum. It may not contain any appreciable quantity of protective substances, but, on the contrary, may hold, practically unaltered, the identical bacterial poisons which were originally incorporated into the horse. Thus, the substance administered may be a vaccine and not an antitoxic serum. To safeguard the patient, the following points should be determined before utilizing a serum: (1) *Whether the antiserum does or does not possess toxic properties.* One antistaphylococcic serum was found to be very toxic. (2) *Whether the incorporation of the serum lowers the resisting power of the animal organism to the corresponding bacterial infection,* as was the case with one of the antiplague sera. (3) *Whether the addition of a serum to normal human serum does or does not deprive this serum of its antibacterial powers.* It is quite probable that many antibacterial sera do act as vaccines. He suggests that this is true, for example, of Chantemesse's antityphoid serum. Such vaccines may act very well. The direct introduction of bacterial elements into the tissues may call forth a greater production of protective substances than when they circulate in a diluted form in the blood. The scheme of dosage and the description of the reaction obtained with Chantemesse's serum point to its action as a vaccine. The method of using a vaccine is, of course, completely different from that of a true antitoxin, and to employ a vaccine in the latter fashion would be dangerously erroneous.

CHOLERA.—Former workers have demonstrated that the cholera toxin is of the endocellular variety, and is somewhat unstable in

character and readily converted into less toxic modifications. In fluid cholera cultures the filtrates are less toxic than the unfiltered cultures. To obtain the toxins contained in the cell bodies, MacFadyen⁵ has employed the cold-grinding method. A watery emulsion of a highly virulent culture grown on nutrient agar is made, and washed in a high-speed centrifuge. The separated organisms are then triturated at the temperature of liquid air, and the product is taken up in 1-1000 caustic potash. On spinning, a clear supernatant fluid, representing a 10 per cent extract of the bacilli, was obtained. The yield from the various grinds was remarkably constant, averaging 10 mgrams of solid matter for each cc. of juice. The toxicity of the juice varied directly with the virulence of the culture. The juice deteriorates in toxic power on keeping or on heating, but fresh juice is very toxic for rabbits, goats, and guinea-pigs. Immunizing experiments were carried out on goats and rabbits, and it was found that the blood acquired marked anti-endotoxic power, and that the serum possessed agglutinative and bacteriolytic properties.

DYSENTERY.—Trimescu⁶ reports five cases in which he obtained very successful results with a serum supplied by the Vienna Serotherapeutic Institute. In fresh cases the serum acts very promptly, and improvement is evident on the second day.

Jehle⁷ also mentions two cases in which the use of Kruse-serum was beneficial. In each case one subcutaneous injection of 25 cc. was sufficient to neutralize the dysenteric virus.

Vaillard and Dopter⁸ describe the action of a serum manufactured by them. Horses are treated with the toxins and living cultures of the *Bacillus dysenteriae*. The injections are made both into the subcutaneous tissue and into the veins. The resulting serum exerts both a curative and prophylactic action upon rabbits, which does not persist for more than eight to ten days.

In a series of 96 cases of dysentery, the effect of the serum was an almost immediate improvement in all symptoms, both general and local. Colic and tenesmus diminished in intensity, and disappeared within twenty-four hours. Parallel with this improvement the stools lose their dysenteric character, become feculent, and are reduced to one in the day. The general condition is favourably influenced. In all the patients the duration of the disease has been materially shortened. In cases of moderate severity a cure is obtained in two or three days, and in very severe cases from four to six days: three desperate cases were cured after eight, eleven, and twenty days. Convalescence is rendered short and easy. The contrast with cases treated on the old plan is very marked. Though the best action is obtained with an early use of the serum, it acts fairly well in protracted forms.

In slight cases 20 cc. of the serum are sufficient, but 30 cc. are required in severer forms, and in ominous cases the immediate injection of 40-60 cc., followed on the following day by further injections, is essential.

ERYSIPELAS.—Fornaca⁹ has treated this disease by serum obtained from patients on the second or third day of convalescence. The injections varied in number from one to three, and the amount of serum used at each injection from 10 to 50 cc. The total quantity used in each case varied between 20 and 90 cc. The effect was seen in a fall of temperature and improvement in the general condition, but the local erysipelatos symptoms do not seem to have been altered. From further investigations he concludes that the serum is not bactericidal, but diminishes the virulence of the streptococcus.

GONORRHOEA.—The treatment of gonorrhœal rheumatism is notoriously unsatisfactory. Turrey¹⁰ has prepared an antigonococcus serum which has been used by him and Rogers with a fair measure of success. The cultures were made on a mixture of rich ascitic fluid and slightly acid beef-infusion peptone broth. Rabbits were used in obtaining the serum, and were inoculated with intraperitoneal injections every five or six days with cultures from six to fifteen days old. Both cultures and micro-organisms were injected. The first inoculation caused a great loss of weight, but subsequent repetitions produced less disturbance. Eventually the rabbits reached a condition of hypersensitiveness to the toxin, and then succumbed to smaller doses than would prove fatal to untreated animals. The blood was drawn off from the ear or carotid, and was more potent from the later bleedings. The serum has some antitoxic action, but its chief value seems to depend upon its bactericidal power. It is probable that the serum supplies the system with enough immune bodies to destroy the few organisms which are present in gonorrhœal rheumatism.

Rogers¹¹ gives 20–60 cc. in suspicious cases of arthritis. He injects it into the loose fascia on the back of the upper arm. The serum has little action on the urethritis, but the arthritic condition is much improved and the whole course of the disease is shortened. As long as the urethritis persists, there is danger of a relapse.

CEREBROSPINAL MENINGITIS.—Kolle and Wasserman¹², after great technical difficulties, have prepared an antitoxic serum for the meningococcus: they state that it may be used by human patients in doses of 10 cc.

PUERPERAL FEVER.—Martin¹³ has used Menzer's antistreptococcic serum in a series of cases of puerperal fever which were not of gonococcic origin: he finds that it aids the patient in the fight against the infection. Temperature and the length of the illness are both favourably influenced. On the first day of fever the dose of 20 cc. is injected. If the temperature has not kept below 38° C. throughout the next day, a further injection of 20 cc. is given, and if necessary this dose is repeated on the third day. If the temperature remains high from the sixth day on, a further series of three similar injections is made on the next three days. Busalla¹⁴ has subjected Martin's statistical findings to a searching criticism, and does not agree that they support his contentions.

RHEUMATIC FEVER.—Kanel¹⁵ reports on a series of cases treated with the antistreptococcus serum of Menzer. Sixteen of the cases were acute and five were subacute manifestations of rheumatic fever. He employed at first injections of 5–10 cc., and later gave quantities of 50 cc., both intravenously and subcutaneously. The reactions corresponded exactly with those described by Menzer. In 6 cases the results were negative, 1 case improved, and the remaining 14 were completely cured, though four had proved refractory to salicylate treatment. Of the 6 unsuccessful cases, 4 were equally unsuccessfully treated with salicylates, but 1 improved rapidly under aspirin. Kanel concludes that the serum is harmless, and in some cases gives good results when salicylates have failed. He does not find the presence of endocarditis any contra-indication.

SCARLET FEVER.—Moser's serum has been tested by several observers. Bukowski¹⁶ used it during an epidemic of a comparatively mild type, but found it of great benefit. Winocouroff¹⁷ reports in similar terms from 9 cases treated with the serum. Schick¹⁸ strongly urges a more extended application of the method in severe cases of scarlatina. In a series of 60 extremely severe cases selected out of 660, his mortality was only 16·6 per cent. The dose used was 200 cc., though in some cases this amount was doubled. A serum reaction appeared in three-quarters of the cases, but was not so severe as to interfere with convalescence. Zuppinger¹⁹ claims that, when injected in full amounts and at the right time, Moser's serum has a powerful specific action on the poison of scarlatina, and in very severe cases it alone is capable of saving the patient: it is most successful in those cases in which throat symptoms are prominent, especially if used before general septicæmia has supervened. In most cases a critical fall of temperature is noted, with improvement in pulse-rate and respiration as well as in the general condition.

Another serum recommended is that of Marfan. Campe²⁰ ascribes to it a prophylactic action, which he has tested in 200 cases. The serum diminishes the restlessness, lessens headache and throat symptoms, and improves both temperature and pulse.

Menschikoff²¹ has used Moser's serum and one prepared by Sawtschenko. In severe cases he injects 180–200 cc. at once, or 300 cc. in two injections, with an interval of a day. The injections were made into the subcutaneous tissue of the flank, and caused comparatively little discomfort, if slowly performed. The temperature generally fell within a couple of days by crisis, except in cases of mixed infection with streptococci and influenza bacilli: simultaneously, the pulse became fuller and the breathing less rapid. Within twenty-four hours the general condition is much improved, delirium and headache cease, and appetite returns. The serum seems to exert a direct antitoxic action, and its effect upon the local throat manifestation is unmistakable. The earlier the serum is used the better. Complications are not prevented by the serum, but seem to be less severe.

SNAKE POISON ANTIVENENES.—A commission in Caracas has tested the comparative action of Calmette's antivenene with that of antiophidic serum manufactured by Dr. Brazil²²; the latter contains different immunizing bodies, and has been found more efficacious against the venom of *crotalus* than Calmette's antivenene. Calmette worked chiefly with cobra venom, and his serum contains antitoxins for the hæmolysins and neurotoxins of that genus, but is quite ineffectual against the specific hæmorrhagins of the *crotalidæ*.

TYPHOID FEVER.—MacFadyen²³ has produced an antitoxin for the endotoxin contained in the cell bodies of the typhoid bacilli. The most suitable animal was the goat. The endotoxin was obtained by triturating washed, virulent young cultures at the temperature of liquid air, and then taking up the resultant mass with weak caustic potash solution and centrifuging. The endotoxins obtained are unstable bodies, but it was possible to immunize goats against them by carefully graded intravenous injections. The serum acquires a considerable degree of antitoxic power, inasmuch as $\frac{1}{50}$ cc. of the serum neutralized 30 lethal doses of the toxin. This is much higher than that obtained by Besredka²⁴, who immunized horses by intravenous injection of dead and living typhoid bacilli. The goat serum acted either when injected simultaneously or separately from the toxin, or even at the commencement of toxic symptoms. It also possesses agglutinative and bacteriolytic properties.

Brunon²⁵ reports a series of 100 cases of enteric fever in children which he has treated with injections of antityphoid serum. The mortality was only four, whereas, in another group of 82 cases treated at the same time by the ordinary methods, the mortality was 17 per cent. The injection is usually followed by a rise of temperature which lasts from two to five days. The earlier the serum is used, the better the result.

Chantemesse²⁶ gave an interesting account of his five years' experience with serum therapy in typhoid fever. During this period the mortality in Paris has averaged 17·3 per cent; but in one institution, in which serum therapy has been used in addition to the ordinary treatment, the average mortality was only 3·7 per cent. The temperature curve of those receiving serum treatment is completely altered, and always in a definite manner. Two periods are clearly recognizable; the first lasts from three to five days after the injection, and is characterized by a "reaction," during which the spleen and lymphoid tissue swell and the blood becomes charged with leucocytes: the second is one of "defervescence": it follows abruptly on the first stage, and more quickly the earlier the injection is given. Sometimes the reduction in temperature is accompanied by a rise in the pulse-rate, but this is always associated with increased blood-pressure. The serum induced a marked polyuria during convalescence, and any albuminuria rapidly disappears. The whole course of the disease is shortened, largely from absence of complications.

Hæmorrhage has not caused any death among those treated with the serum. In 9 cases out of 712, perforation occurred, but in all these the serum was used late in the disease. No fatality occurred among the patients to whom the serum was given in the first week of the disease. He points out that the serum acts as a powerful bactericide and antitoxin: its chief value seems to depend upon its stimulating action upon the lymphoid tissue.

Josias²⁷ has had a similar success. During four years he has treated 132 cases, with 6 deaths, of which one was due to acute tuberculosis. The complications noted were, hæmorrhage 5 cases, otitis 5, phlebitis 2, acute nephritis and periostitis 1 each. Relapses were not common, and were of a mild character. He concludes that Chantemesse's serum is harmless if used according to the directions, and that children treated with long applications of serum and tubbing have a much better chance than those who receive only tubbing without serum.

Typhoid Inoculation.—The prophylactic value of antityphoid inoculation is well brought out in an article²⁸ by a German writer. Among the German troops in South-West Africa the course of the disease was observed in 424 cases, of whom 100 had previously been inoculated within ten months of the attack. Among the uninoculated the mortality was 11·1 per cent, among the inoculated 4 per cent. In the former class, in 25 per cent the disease was severe, in 21·3 per cent average, and in 42·3 per cent slight; of those inoculated, the figures were 10 per cent severe, 20 per cent average, and 66 per cent slight. Among the inoculated, complications were noted in 20 per cent, but in the uninoculated class it was 35 per cent, and the whole course of the fever was more severe. To avoid any risk of infection during the negative phase, those inoculated should not go to an infected region till three weeks have elapsed after the injection.

Harrison²⁹ states that the vaccine used in the British Army has recently been modified. It is now recommended that the first dose contain 500 million bacilli, and the second 1000 million, to be made after ten clear days. The clinical effects are milder than with the former vaccine. The site of inoculation becomes tender about three hours after the injection, and in the course of seven hours the temperature rises to 100° or 101° F., but no more malaise is experienced than with an ordinary cold. The whole of the following day the part inoculated remains tender, especially if any alcohol be taken. After about thirty hours all symptoms have disappeared, except slight pain on pressure over the site of the injection. There is no vomiting, headache, or diarrhoea as a rule. After the second injection the reaction comes on more quickly and passes off more rapidly, but as a rule the general reaction is less than with the first dose.

TUBERCULOSIS.—Marmorek's serum has been tested by several writers who, on the whole, write in favourable terms of its action. Schwartz³⁰ reports an unusual case of tubercle of the connective

tissue of the eye, which was healed with the injection of 289 cc. The treatment extended over three months, and an undoubted specific action was obtained. Bassano³¹, in a series of 5 cases, observed benefit from the subcutaneous use of the serum, especially in cases of surgical tubercle. The serum exerted no deleterious action, and had a distinctly beneficial action upon the general condition, temperature, and sputum. Frey³², after two and a half years' experience, is a strong advocate for its employment; he finds it exerts a distinct specific action upon tuberculous lesions. The immediate effect is of an antitoxic nature; the general feeling of illness diminishes, fever is reduced, and the appetite improves; cough and expectoration are less troublesome, though in several instances the amount of sputum is increased at the commencement of treatment. The shorter the time that the symptoms have persisted, the more rapidly is improvement manifested. The physical signs of tissue alteration also improve, but gradually. The serum seems best administered to sensitive patients by the use of rectal injections, either of the serum alone or mixed with yolk of egg. After a non-irritating, cleansing enema, 5-15 cc. of the serum is injected, and is readily retained, and if necessary can be given twice daily, though as a rule once a day is sufficient. Mannheim³³ and Hoffa³⁴ also recommend this method, which they state avoids most of the unpleasant serum side-actions. The subcutaneous injection of serum in emaciated patients is often painful.

Though most of the reports are very favourable, Stadelmann and Benfey³⁵ found in a series of 5 cases that the serum was of no benefit. In no case was there any improvement either in the local condition or in the general health. Many of the injections were followed by severe febrile disturbance and unpleasant skin eruptions.

Levin³⁶ has collected a mass of statistical information from Sweden, Norway, and Denmark, and is, on the whole, convinced that the serum acts favourably on tubercle. A large number of experiments on animals showed that the serum, while not able completely to prevent the growth of tubercle, markedly retards the rate at which the disease spreads, and prolongs life very materially. From a series of 133 clinical cases, treated partly in sanatoria and partly in private practice, he found a distinct improvement in over half the cases. The period of observation is rather too short to enable him to state whether this improvement is permanent. The three chief subjective symptoms—shortness of breath, lack of appetite, and loss of strength—were materially improved, while the physical signs altered for the better in about half the cases. Walter, of Halahult, whose experience is based upon a series of 26 cases, states that the serum exerts a definite curative action. He used it almost exclusively in advanced cases, and found that, despite the unpleasant nature of the serum reaction, the patients desired the continuance of the injections, as they found that the shortness of breath was diminished,

the sputum came up more easily, and the dry, hacking cough disappeared.

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OPSONINS AND VACCINE INOCULATIONS.

BY

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OPSONINS.

SIR A. E. WRIGHT has shown that there exist in the serum of the blood substances which have the power of preparing the various bacteria for phagocytic action. These substances are called opsonins, from the Greek *opsono*, I cook for table, I prepare pabulum for. Metchnikoff, in his "phagocytic theory of immunity," did not attach any importance to the blood serum, but the following experiment—the basis of all opsonic work—shows that the blood plasma plays an all-important part in phagocytosis. The experiment demands the separate preparation of the three essential elements for phagocytosis, viz., (1) *Leucocytes* washed free from plasma; (2) An emulsion of the *micro-organism* under experiment; and (3) A few drops of the blood *serum* of the individual whose phagocytic power is to be tested. Now, if equal volumes of plasma-free leucocytes and bacterial emulsion are placed in a capillary pipette and incubated at 36° C. for fifteen minutes, no phagocytosis is found to have occurred. If, however, the experiment be repeated, but with this difference, that the capillary pipette contains, in addition to the leucocytes and the bacteria, an equal quantity of serum taken from some healthy individual, a more or less active phagocytosis will ensue. It is clear then, that the serum supplies a substance or substances essential for phagocytosis. These substances Wright calls opsonins, because they act by preparing the micro-organism for ingestion by the leucocytes. These opsonins are destroyed by heating the serum to 60° C. for fifteen minutes.

Opsonic Index.—The relative amount of opsonins possessed by an individual for a particular micro-organism can be accurately measured, and this is effected by counting the number of bacteria ingested by a certain number of leucocytes when mixed with some of the individual's serum, and comparing this number with the phagocyte count obtained when using the serum of a normal individual instead of the serum of the individual under experiment.

Example:—Required, the opsonic content of a patient's blood in relation to the tubercle bacillus. Two phagocyte counts are made. Suppose that patient's serum + plasma-free leucocytes + emulsion of T.B., after incubation at 36° C. for fifteen minutes, resulted in the ingestion of 240 T.B. by 40 leucocytes, then the phagocyte count would be $\frac{240}{40} = 6$; and suppose that a normal individual's serum + plasma-free leucocytes + emulsion of T.B., after exactly similar treatment, showed that 160 T.B. had been ingested by 40 leucocytes, then the phagocyte count would be $\frac{160}{40} = 4$.

The "opsonic index" of the patient for tubercle bacilli is then expressed by the ratio—

$$\frac{\text{Patient's phagocyte count}}{\text{Normal phagocyte count}} = \frac{6}{4} = 1.5$$

If in another case the number, say, of staphylococci ingested per leucocyte in the presence of a patient's serum is 14, while the number of ingested staphylococci per leucocyte in the presence of a normal individual's serum is 20, then the patient's opsonic index for staphylococci = $\frac{14}{20} = 0.7$.

Phagocytosis depends upon the Serum and not upon the Leucocyte.—The following is an interesting and instructive experiment performed by Bulloch and Atkin, and one that goes to show that in phagocytosis the leucocyte is an indifferent factor, that the amount of phagocytosis is independent of the leucocytes employed, but varies with the serum employed. They used the serum and the leucocytes of a normal individual, and compared the results with those obtained from the sera and leucocytes of three advanced cases of facial lupus (A, B, and C), the test material being a suspension of T.B. :—

1	Serum of normal individual	+	{ T.B. (suspension)	+	{ Leucocytes of normal individual	=	{ 5.7 T.B. per leucocyte
2	ditto	+	{ ditto	+	{ Leucocytes of lupus patient A	=	{ 5.4 T.B. per leucocyte
3	ditto	+	{ ditto	+	{ Leucocytes of lupus patient B	=	{ 5.2 T.B. per leucocyte
4	ditto	+	{ ditto	+	{ Leucocytes of lupus patient C	=	{ 5.3 T.B. per leucocyte
5	Serum of lupus patient A	+	{ ditto	+	{ Leucocytes of normal individual	=	{ 2.5 T.B. per leucocyte
6	Serum of lupus patient B	+	{ ditto	+	{ ditto	=	{ 2.4 T.B. per leucocyte
7	Serum of lupus patient C	+	{ ditto	+	{ ditto	=	{ 3.2 T.B. per leucocyte

From such a result as this it must be clear that the amount of phagocytosis does not depend upon the nature of the leucocytes, but upon the serum employed.

VACCINE INOCULATION.

Vaccines are the dead bodies of micro-organisms sterilized by heating to 60° C. for one hour. The inoculation of a vaccine is followed by the further manufacture of opsonins, or in technical language, by a raising of the opsonic index. Immediately, however, after the injection of a vaccine, there follows a diminution in the opsonic content of the blood, Wright's *negative phase*, which probably means that the vaccine combines (enters into destructive chemical combination) with the opsonins already present in the blood. This negative phase is succeeded by an increased amount of opsonin, Wright's *positive phase*, which points to the cells of the organism being stimulated to activity, so that the opsonins are replaced and with usury. This increase in

the opsonic content of the blood continues for a time, the *maintained high tide of immunity*, but after a while (ten to fourteen days, or sometimes three to four weeks) it gradually declines to the level at which it stood prior to the inoculation.

This sequence of events, in which the negative is followed by a positive phase, and this latter by the high tide of immunity lasting for a time and then falling to its former level, occurs after the inoculation of any bacterial vaccine. Wright first established this in connection with anti-typhoid inoculations, but since then he and his pupils have carried out similar researches with the tubercle bacillus, the pneumococcus, the staphylococcus, the streptococcus, the gonococcus, the proteus bacillus, the bacillus coli, the plague bacillus, and the bacillus of Malta fever.

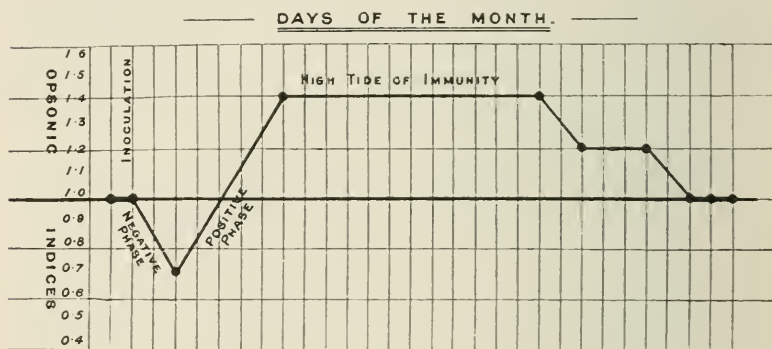


Fig. 1.

Fig. 1 represents in a diagrammatic manner the results of a single vaccine inoculation in an individual with a normal opsonic index.

If a large dose of vaccine be employed, the "negative phase" is accentuated and prolonged, and *may* be accompanied by a temperature reaction and by constitutional disturbance. If a small dose be given, the negative phase is fugitive, and will certainly be unaccompanied by any clinical symptoms.

During the "positive phase," in which the patient's content in anti-bacterial power is raised, there *may* be a sense of increased physical vigour and a well-pronounced feeling of well-being.

Cumulation of Negative and Positive Phases.—If, instead of a single inoculation, a series of inoculations is undertaken, a cumulative effect is produced, at any rate with regard to the negative phase. If, therefore, a second inoculation be made during the negative phase of a former inoculation, the opsonic index may be so seriously lowered as to lead to a disastrous result. To such a lowering are attributed the fatalities that occurred from time to time when Koch's old tuberculin was used in progressively increasing doses. Unfortunately no such cumulative results have been obtained in the positive phases. Wright insists

on a determination of the opsonic index immediately before each inoculation, and warns against any dependence on clinical symptoms for indicating the presence of the negative phase. For such symptoms (pyrexia and malaise) probably mean a *dangerous* lowering of the patient's resistance.

Dose of the Vaccine.—For the purpose of inoculation exact doses of a vaccine have to be used, and this necessitates *standardization of the vaccine*. For staphylococci the dose varies between 500 million and 2,500 million microbes for each inoculation. For tubercle bacilli the dose varies between $\frac{1}{1000}$ mgm and $\frac{1}{800}$ mgm of tubercle powder (obtained by the comminution of tubercle bacilli by the action of machinery).

OPSONIC INDEX IN HEALTH.

Bulloch determined the opsonic index of 44 medical students and 40 hospital nurses for the tubercle bacillus. Taking the two series together, the average index for the 84 was 0.96, the variations lying between a minimum of 0.8 and a maximum of 1.2. The opsonic index of his own serum was taken as 1.0 and used for comparison.

Urwick has shown that in healthy people the opsonic index does not vary from day to day.

The opsonin is a relatively stable substance in the serum, and does not deteriorate for at least twelve hours after the withdrawal of the serum from the body.

OPSONIC INDEX IN DISEASE.

1. *Localized Infection.*—In localized infections the opsonic index is generally lower than that which is found in health. Thus, Wright found, in 20 cases of localized staphylococcic lesions, indices varying from 0.1 to 0.88, with an average of 0.62.

Bulloch determined the opsonic index in 150 cases of lupus, and found that in 75 per cent of the cases it was below the normal limit (varying between 0.3 and 0.8), and in 25 per cent it was within, or a little above, the normal limit (varying between 0.9 and 1.4).

In 11 cases of surgical tubercle (including cases of tuberculous joints, tuberculous glands, and genito-urinary tuberculosis) the index varied between 0.3 and 0.8, the average being 0.6.

In 13 cases of so-called "sanatorium cures," or arrested cases of pulmonary tuberculosis, the opsonic index was below the normal limit, 0.8.

2. *Systemic Infections.* In systemic infections the opsonic index is either high or is a fluctuating quantity. Thus Ross, working on cases of pyrexial phthisis, drew the following conclusions:—

(a). The opsonic index in cases of pyrexial phthisis is either high (i.e., above the normal, 1.2), or is a fluctuating quantity, on some days being lower than 0.8, on other days higher than 1.2, varying by as much as four or more decimal points when observations are made from day to day.

(b). The effect of rest in bed is to tend to lower the opsonic index.

(c). The effect of exercise is to elevate an index which has been previously lowered by rest in bed.

(d). The absence of a high or of a fluctuating tuberculo-opsonic index in a patient acutely ill is strong evidence against the infection being tuberculous, and in this way the determination of the opsonic index has proved of value in diagnosis, e.g., in differentiating between acute tuberculosis and infective endocarditis.

(e). The determination of a tuberculo-opsonic index of 0.6 or less, upon several occasions, is in favour of an early or localized tuberculous infection of the lungs or other viscus.

Specificity of Opsonins.—An individual may possess a high opsonic index for one organism and a low index for another. Similarly, to take a concrete example, an injection of tuberculin will produce an increase in the tuberculous opsonin, while the staphylococcic opsonin remains unaltered, and, *vice versa*, an injection of staphylococci will increase the quantity of the staphylococcic opsonin without affecting the amount of the tuberculous opsonin.

Leucocytosis and the Opsonic Index.—No constant relationship exists between either the quantity or the quality of the leucocytosis that may occur in the course of a bacterial infection and the opsonic content of the patient's serum.

Variation of the Opsonic Index in Localized and Systemic Infections.—The *low* opsonic index of localized infections precedes the infection, and may be said to be the cause of its occurrence. It remains low because the bacteria remain localized, i.e., do not enter the blood-stream, for, if they did, they would act exactly as does an experimental inoculation of bacteria, and there would result a negative followed by a positive phase with its maintained high tide of immunity. In other words, an immunizing influence on the patient would be exerted. But the bacteria are localized, and so these phenomena do not occur, and this is why these localized infections do not tend to get well of themselves; they are indefinite in duration. Thus, a case of lupus may commence in earliest infancy and run on through sixty or even more years, terminating only with the life of the patient.

The case, however, is quite different with systemic infections. In these the *high* or *fluctuating* opsonic index is caused by the entrance of the bacteria into the blood-stream, with the result that a series of auto-inoculations with their positive and negative phases occur, similar to those which are produced by the experimental inoculation of a vaccine into a patient, but with this difference, that the doses of vaccine are not appropriately adjusted, and, moreover, are repeated often at inappropriate times. Thus it happens that systemic infections terminate either in a cure not long delayed (a specific fever ordinarily runs its course within a limit of one, two, or three weeks), when these auto-inoculations result in successful immunization, or else terminate in death when the machinery of immunization has been overtaxed.

TREATMENT OF LOCALIZED INFECTIONS.

The principles of the treatment of localized infections by vaccine inoculations controlled by the determination of the opsonic index will be best understood by reference to a simple experiment by which it was proved that the lymph in the interior of a boil (a boil may be taken as the type of a localized infection by the staphylococcus) was poorer in staphylococcic opsonin than the serum of the circulating blood. This is because the circulation of the lymph within the boil is stagnant, and in spite of this lymph having been derived from the circulating blood relatively rich in opsonins, it must have parted with its opsonins to the numerous bacteria with which it came in contact in its passage from the outside to the interior of the boil. On this theory the principles of treatment are based, and the successful treatment of localized infections aims therefore at two objects :—

1. Making the lymph circulate more rapidly through the focus of infection, so as to bring the opsonins of the blood into contact with the infecting bacteria.

2. Raising the opsonic content of the blood ; for this, we have seen, is invariably low in localized infections.

The more rapid circulation of the lymph is effected by such familiar measures as hot poultices, hot fomentations, the application of iodine and other rubefacients, the X rays, the Finsen light, radium. etc. Wright recommends as an inexpensive and convenient method the application of bags filled with hot sterilized sand.

The raising of the opsonic content of the patient's blood is effected by inoculation of sterilized bacterial vaccines, always controlled by determinations of the opsonic index. Thus, in the case of lupus, Bulloch found that of the 150 cases above mentioned, all of which were being treated by Finsen light, those with a high opsonic index (25 per cent) clinically did well, those with a low index (75 per cent) clinically did badly. He holds that the action of Finsen light is not bactericidal, but is to cause a local inflammation, and thereby a more rapid circulation of the plasma in the areas exposed to its action. The ideal treatment, then, of lupus, according to this view, is to raise the opsonic index by inoculation of tuberculin in cases with a low index, and then to apply the Finsen light with a view to flushing the infected focus with lymph rich in opsonins.

Effect of Massage and of Physical Exercise.—Wright has shown that the effect of massage and of physical exercise on a tuberculous knee, for example, is to raise the opsonic index, after temporarily lowering it in the first place. This is exactly what follows an experimental inoculation of tuberculin, and Wright considers that the effect of massage and of muscular movements on an infected joint is to discharge a number of bacteria into the circulating blood—a process of auto-inoculation.

TREATMENT OF SYSTEMIC INFECTIONS.

On theoretical grounds it is difficult to say what benefit can be expected from the inoculation of bacterial vaccines in systemic infections, where, as we have already seen, auto-inoculations spontaneously occur: and this theoretical objection accords with the results of treatment. Taking pyrexial phthisis as the type of a systemic infection, Wright suggests that the following programme should be followed:—

1. Efforts must be made to convert the systemic into a purely localized infection. This may be achieved by rest in bed, and by the adoption of such means as increase the coagulability and viscosity of the blood (e.g., by the exhibition of calcium salts and a milk diet). If by such means we have been successful in converting a systemic into a localized infection, we must at this stage apply the principles for dealing with localized infections, and therefore

2. Appropriately adjusted inoculations of a tubercle vaccine must be substituted for the inappropriately adjusted auto-inoculations which previously wore the patient down without achieving effective immunization.

3. At the same time, attempts must be made to irrigate the foci of infection with a lymph rich in opsonins by a careful regulation of the patient's exercise, and by attention to his blood-pressure, taking steps if necessary to diminish the coagulability and viscosity of his blood by the exhibition of citric acid.

RESULTS OF TREATMENT.

It is impossible in such an account as this to do justice to the many remarkable therapeutical results obtained by vaccine inoculations. The method of treatment has been mainly applied to staphylococcic lesions (including cases of acne, furunculosis, and sycosis) and to localized tuberculous lesions. An account of Wright's results with regard to staphylococcic lesions will be found in the *British Medical Journal*, May 7th, 1904, and with regard to tuberculous lesions in the *Lancet*, December 9th, 1905.

Ross¹ describes the successful treatment of a persistent sinus after the resection of a rib for empyema.

J. Pardoe² describes the results of treatment in 21 cases of tuberculosis of the urinary system.

J. B. Coleman³ quotes a case of unresolved lobar pneumonia of the whole of the right lung, with dullness over the left lower lobe, successfully treated by an inoculation with a pneumococcus vaccine.

A. Butler Harris⁴ gives details of treatment in a number of phthisical cases, which he divides into (1) Cases with a low opsonic index which do not vary from day to day; (2) Early cases with a high opsonic index; (3) Cases which show great variations in the opsonic index at varying intervals of a day or more.

The Opsonic Index as an Aid to Diagnosis.—Lawson and Stewart⁵ testify to the value of opsonic determinations in diagnosing between tuberculous and non-tuberculous affections. Ross⁶ shows how opsonic determinations can be utilized in the diagnosis of certain difficult and doubtful cases.

Effect of Exercise on the Opsonic Index.—The effect of exercise on the opsonic index has been studied both in health and in disease. Ellett⁷ worked on healthy individuals and found that in these, exercise had the effect of *lowering* the opsonic index.

Meakin and Wheeler, working on patients undergoing sanatorium treatment for phthisis, found that the opsonic index was temporarily *raised*. Patients who were resting all day showed no variation in the opsonic index, but in others who were taking exercise it was found that, after walking, the opsonic index was raised. These observers suggest that the effect of exercise is to lead to a slight degree of auto-inoculation with tuberculous vaccine, which expresses itself by a transient rise of the opsonic index.

Influence of Antitoxic Serum on the Tuberculo-opsonic Index.—Bradshaw⁸ found that the tuberculo-opsonic index of apparently tubercle-free patients was lowered (average = 0.73 in 9 cases) after the administration of antidiphtheritic serum. The lowering of the tuberculo-opsonic index in a healthy man after the administration of a prophylactic dose of antitetanic serum has also been noted.

Methods of Estimating Opsonic Indices.—French⁹ lucidly describes in detail the method employed for estimating the opsonic index, as originally introduced by Leishman and subsequently modified by Wright. In this article, and in one by Ross¹⁰, an excellent up-to-date summary of the entire subject of opsonins will be found. Simon and Lamar¹¹ describe a different method of estimating the opsonic content of the blood and other fluids, such as pleural and peritoneal exudates. This method depends upon the fact that human leucocytes, when washed with normal salt solution containing 0.1 per cent of ammonium oxalate, promptly lose their phagocytic power, but that this can be restored by the subsequent addition of normal serum.

It is well to look at every new theory from opposite points of view, and those who desire so to do with regard to opsonins will find in an article by Watson Cheyne¹² a healthy and vigorous criticism of Wright's theories.

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ELECTROTHERAPEUTICS AND RADIOTHERAPEUTICS.

BY

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THE available literature of the past year all goes to show the increasing importance of electricity and X rays in the diagnosis and treatment of disease. Nothing of a strikingly novel kind has been discovered, but very considerable progress has been made in a general way, including a few diseases in which X rays have been applied with success for the first time.

A noteworthy feature has been the very few novel ideas in the way of apparatus, which is the more remarkable when we look back on the numerous new devices which were being constantly brought out, the notice of which took up a considerable portion of this article in former years.

A very pretty instrument, which proved of value in studying the currents flowing through the X-ray tube, is the oscillograph tube of Geherecke, which we had the pleasure of exhibiting for the first time in this country at the meeting of the British Electrotherapeutic Society in November, 1905. This tube has the property of showing a brilliant violet glow over the negative electrode, and this glow extends to a distance proportionate to the current. It is also aperiodic, and no matter how rapidly the current fluctuates, it keeps pace with it exactly. The electrodes are straight pieces of moderately stout wire, placed axially in the tube, and nearly meet at the middle. When a constant current is passed, the glow is on one wire only, but if an alternating current is used, it extends over both, and shows at a glance if the two waves of the current are of equal amplitude.

If it is examined with a rotating mirror while in action, the different amplitudes are separated out and the true form of the curve accurately shown. Used in series with an X-ray tube it shows the efficiency of the value tube, if one is employed, or if not, the relative amount of inverse current flowing through the circuit. If now we use the rotating mirror, we find what few suspected, viz., that the duration of the current impulses through the tube are exceedingly short. Under ordinary conditions the faster the mirror is rotated the more the cones of light are widened out, but when the X-ray tube is in circuit, the duration of the impulse is so short that the band of light is not appreciably widened even by very rapid rotation. These oscillograph tubes are now, we understand, manufactured in this country by Cossor, and are also quite inexpensive. For the experimenter in variable currents, from any source or for any purpose, they are invaluable.

Gaiffe, who can generally be depended upon to give us at least one new piece of apparatus each year, has adapted his motor mercury break to work with alternating currents with great success. It is easily started and synchronizes very readily. The primary current is broken at the right moment and, used in conjunction with a graduated transformer, its range of usefulness is very great. It is said to answer very well for charging accumulators. This will be a great boon to those who wish to work their coils from the alternating mains. It is supplied in this country by the Medical Supply Association, Gray's Inn Road, W.C.

With regard to X-ray tubes, excepting a few minor modifications—chiefly directed towards altering the vacuum—nothing new has been brought out. Experience with the Chabaud tube, which caused such a sensation last year, has served to disclose some of its weak points. Such as have been found are, in all probability, due to the small size of the bulb. The most serious fault in our hands has been the great liability to sudden alteration of its resistance while in use. One does not care to say that it alters its *vacuum*, because it is not at all apparent how this could take place so rapidly, but it would seem that the residual molecules of gas, which act as the carriers of the charge from one electrode to the other, become in some way occluded in an out-of-the-way part of the tube, and so fail to carry out their function. It is not unlikely that at the degree of vacuum which exists in a Crookes' tube, the residual gas is not evenly distributed throughout the interior, and that the molecules are free to occupy pretty much any part of the tube they may be driven into, and remain there until dislodged by heating or other means. This fault is not, in our opinion, peculiar to this or any other make of tube, but we have found it very frequently in tubes with small bulbs. The use of a value tube in series does not appear to make much difference one way or the other. The cure of this disorder is a problem to which tube makers should give attention.

A curious fact was observed by us when working with the Chabaud tube. As ordinarily supplied, there is a paper protector for the osmo-regulator, which can be slipped on or off as required, and is intended merely to prevent mechanical injury to the metal tube. Ordinarily one would not credit it with any property of altering the electrical condition of the tube, but we have found that when this paper protector is in place, the resistance of the tube, as measured by the alternate spark-gap, is twice or three times what it is when it is removed and the tube working more or less normally. Moreover, without in any way interfering with the tube itself, this alteration of resistance can be produced over and over again. It is not quite apparent how a cover of insulating material such as paper can produce such a result; probably a satisfactory explanation will soon be forthcoming.

As to the cheaper forms of X-ray tubes of Continental origin, about which we complained so much last year, they have somewhat improved, but in many of them the anti-cathode frequently falls away from the

platinum sealing-in wire, due to inefficient attachment, ruining what would be otherwise a serviceable tube for some considerable time. Speaking generally the cheaper grades of X-ray tubes are not economical and should be avoided.

X-RAY DIAGNOSIS.

A goodly number of papers on this branch of the subject have been forthcoming during the past year. It is interesting to note the rapidly increasing importance of an X-ray examination in the minds of the profession, as also the superior quality and more accurate interpretation of the results obtained. In view of this, a startling paper by Lynn Thomas¹ at least serves to point out the limitations of the usefulness of X rays in the treatment of fractures. In his opinion X rays are of no value in modifying the ordinary methods, and to form a correct diagnosis they are, in nearly all cases, unnecessary. Indeed, one's first impression on reading his conclusions is that, so far as fractures and dislocations are concerned, it is a great pity that X rays were ever discovered; for while he admits that in a few cases they may be of value in clearing up a doubtful point, he later on says, "The evidence afforded by X rays is deceptive, misleading, and should only be submitted to, and acted upon by, those who understand their value."

A much more appreciative stand is taken by Don², who is of the opinion that the radiogram must be utilized in fractures by every conscientious and careful surgeon, however great his skill in diagnosing these lesions by the older methods.

Stereoscopic radiography is increasingly popular, and bound to become more so as time goes on, since the extra apparatus required is quite inexpensive, and except for the orbit, is everything that is necessary as a means of localization. Stöver³ has contributed a valuable paper on this method.

The value of X rays in the diagnosis, treatment, and as a means of watching the progress of tubercular disease of the bones and joints, is well set forth in a paper by Beck⁴. A number of radiographs are reproduced: but it is a pity these were not on plate paper, as much detail has been lost.

In the diagnosis of chest diseases the X rays are more and more made use of and relied upon. That their value is not admitted by everyone was evident from a lively correspondence in a leading medical journal quite recently, but it is impossible to ignore the valuable assistance obtainable, especially in the hands of one who has made a special study of this branch of radio-diagnosis. Baetjer⁵ has given us a valuable paper on the X-ray diagnosis of thoracic aneurysms. His work is based on the examination of a large number of cases in the Johns Hopkins Hospital, and in those which went to an autopsy the X-ray findings were entirely corroborated. Orton⁶ considers that a mistake in diagnosis by a competent observer is very rare, and that it is only exceptionally that complications mask the aortic shadow.

In the radio-diagnosis of disorders of the digestive system, not very

much has been done in this country as yet. In America, however, much progress has been made. At the annual meeting of the American Röntgen Ray Society, held at Niagara Falls at the end of July, 1906, the president, Dr. Henry Hulst, read his paper on the "Röntgenology of the Stomach and Intestines." His work has been to show the value of the X ray in the diagnosis of diseases of the stomach and intestines, especially in dilatation and dislocation of the stomach. He begins by inflating the stomach, giving the acid and carbonate of a saline powder separately. In this way he gets the position of the empty stomach before it is displaced by any appreciable weight of food. An ounce of bismuth is next given in milk, or other convenient medium. Two radiographs are now made—erect and recumbent positions. Six hours later two more are made, and by comparing them one can get an excellent idea of the size, position, and functional activity of the stomach. He always uses a diaphragm, and his exposures seldom, if ever, exceed ten seconds. Plates sufficiently large to take in the greater part of the trunk are used, and the negatives which illustrate his paper are among the best we have ever seen. If further radiographs are taken at a still later period, the colon is shown with a distinctness that is surprising. The lower part of the colon can also be brought out by injecting three ounces of bismuth up the rectum. The shortness of the time of exposure is in a great measure responsible for the excellence of the results obtained, and this is secured by the use of specially constructed coils and large currents through the X-ray tube—ten to fifteen milliampères. Such treatment is, of course, very hard on the tubes, even those with water in direct contact with the anode, but it is worth while making some sacrifice for such good results with such short exposures, and it is conceivable that tubes may yet be designed to meet these conditions. The advantage of short exposure is of course obvious, seeing that it eliminates all need for cumbersome compression apparatus, with their attendant disadvantages, especially in renal work.

Radiography of the urinary tract continues to be a subject of surpassing interest. In probably no class of X-ray diagnosis are radiographers more put upon their mettle than in this. We are usually asked to give a positive opinion—not at all an easy matter at times—and its verification or otherwise quickly follows in many of these cases. It may be safely claimed that our results are continually improving, and that more and more reliance is being placed on the findings of the radiographer. It is extremely doubtful now, if any surgeon will operate for urinary calculus without previous X-ray examination.

An important point has lately been brought out by Morris⁷ as to the opacity of cystin and xanthin calculi. An impression got about that these gave no shadow with X rays, but he shows that they give dense shadows—quite as dense as phosphate of lime, and much more than uric acid calculi of the same size. Thurstan Holland⁸, who is an ardent advocate of the use of the compressor diaphragm, has given us an excellent *résumé* of his work. He believes that when a stone or

stones are present in such size as to suggest the desirability of an operation, such stone or stones can nearly always be shown by X rays, and that there can be no justification for operation or prolonged medical treatment without an efficient X-ray examination being made. The paper is a most interesting one, and should be carefully studied.

REFERENCES.—¹*Brit. Med. Jour.* May 5, 1906; ²*Scot. Med. and Surg. Jour.* June, 1906; ³*New York Med. Jour.* Aug. 25, 1906; ⁴*Ibid.* Nov. 11, 1905; ⁵*Johns Hop. Hosp. Bull.* Jan. 1906; ⁶*Arch. Röntgen Ray*, Aug. 1905; ⁷*Lancet*, July 21, 1906; ⁸*Ibid.* June 2, 1906.

X-RAY MEASUREMENT.

Probably no branch of X-ray research has received more attention during the past year than that of devising some means of easily and accurately measuring the quantity and quality of the radiation given out by the X-ray tube or by radio-active substances. Until some such discovery is made, our methods and results are bound to be more or less crude and uncertain, and owing to the extreme importance of the subject, a brief summary of the means at present employed or suggested for X-ray measurement will not be out of place. These may be divided into two main classes—qualitative and quantitative.

The qualitative methods are of use to enable us to judge the penetration of the rays, and the one most generally known is that of "Benoist's radiochromometer." This is too familiar to need any description here, and so far as it goes is a practically indispensable instrument.

The spintermeter, or spark-gap, gives the equivalent resistance as measured by the distance between the points, and the penetration of the tube increases as this distance increases. In use, the points are gradually separated until the discharge ceases between them and passes through the tube, which is connected to it in parallel.

The milliamperemeter measures the current passing through the tube, and its readings depend on the resistance of the latter. Other things being equal, the higher the readings the lower the resistance of the tube and the lower the penetration of the rays issuing from it. To be satisfactory it should be used in conjunction with the spark-gap and with a value-tube to suppress the inverse currents; in fact it is a good plan to use all three methods above described simultaneously—the spark-gap, value tube, and milliamperemeter being permanently included in the circuit, and the Benoist instrument used from time to time as seems advisable.

Other methods have been suggested, such as (1) Measuring the distance at which it will discharge the electroscope; (2) Comparing the fluorescence of barium platino-cyanide produced by the tube, with that produced by a specimen of radium of known activity; and (3) The standard screen being illuminated by an acetylene light. The first of these is suitable for laboratory use only, and the other two are unreliable owing to the variation in the fluorescence of the platino-cyanides after prolonged exposure to radio-active bodies.

The instrument of Milton Franklin described in this section of last year's *Medical Annual* is an elaboration of the electroscope method,

and though modified and improved by Dr. Deane Butcher, has not as yet come into general use.

All the above methods give us only the *quality* or penetrative power of the rays, and afford no indication of the *quantity* of radiant energy given out or absorbed by the tissues.

The quantitative methods of measuring X-ray dosage are, almost all of them, dependent on the power of the rays to produce some colour or other change in chemical substances. The first one in point of time was that of Holz knecht, consisting of capsules of a yellow substance which are exposed to the rays at the same time as the patient. The colour gradually changes to a green tint, which gets darker as the exposure is continued. A graduated scale of tints is supplied as a standard of comparison. It has many disadvantages: the colour of the scale is not the same as that produced in the capsule, thus giving a greatly enhanced value to the "personal equation," and the scale itself is not permanent, the green colour fading out after a few months.

Freund employs a 2 per cent solution of iodoform in chloroform, which assumes a claret colour under the X rays owing to iodine being set free. Ordinary light does the same thing, so that the solution is not stable. It is possible that some other solvent, such as benzine, might give better results.

The pastille of Sabouraud and Noire depends on the alteration in colour produced by the action of X rays on barium platino-cyanide. It is designed for one purpose only—that of measuring the proper dose for the treatment of ringworm. Only one standard tint is provided. Though inconvenient in use, owing to the pastille having to be fixed at a different distance from the anticathode than the patient, and though the same change can be brought about by the heat of the tube itself, yet with care it is fairly reliable for the purpose for which it was designed.

Kienbock's "quantimeter" depends on the action of the rays upon a photographic developing-paper. After exposure, the paper has to be developed, washed, and fixed, and then compared with a standard scale of tints. Several papers have to be used and developed one by one until the desired tint is attained. This, and the fact that development is necessary, are chiefly responsible for the fact that the instrument has not become popular. Variations in the sensitiveness of the paper are compensated for by corresponding variations in the strength of the developer, the proper factor being determined for each emulsion by the makers. For keeping a record of the total dose of rays in any given case it is excellent, but for ordinary use in clinical work it is tedious. Apart from these drawbacks it is the best method, in our opinion, that has yet been devised.

The methods of Contremoulin and Guilleminot-Courtade are quite unsuitable for ordinary work.

At the annual meeting of the American Röntgen Ray Society in August, two new methods of X-ray measurement were brought forward, in both of which a selenium cell formed an essential part. This, as is well known, becomes a conductor of electricity when light is allowed

to fall on it, and the stronger the light the lower its resistance becomes. In both, the selenium cell is enclosed in a light-tight chamber, and connected in series with a delicate galvanometer to a source of constant current, which must be at least 60 volts.

In the one designed by Dr. George Johnston, one side of the light-tight box is coated with barium platino-cyanide, so placed as to be next to the selenium cell. This side of the box is presented to the X-ray tube, and its fluorescence causes a lowering of the resistance of the cell, and consequently a reading on the milliampèremeter.

The other, designed by Dr. Kennon Dunham, is somewhat different. It consists of a box several inches long and divided into three compartments. In one end is placed the selenium cell, and in the other is placed an ordinary incandescent lamp connected to the main supply. A hole is made in each of the partitions inside the box, so placed that, when nothing intervenes, the light from the lamp will fall directly on the selenium cell. A cylinder-shaped glass bottle, with flat ends and an opening at the side for filling, is obtained and placed in the middle compartment (which it should fit accurately as regards length), so that it lies in line with the holes in the partitions. The bottle is filled with a 2 per cent solution of iodoform in chloroform. The highest readings will be obtained when the solution is fresh, and this is noted. The bottle is then removed and placed on the part to be treated, and from time to time it is re-inserted into the box and further readings are taken. In this way Dr. Dunham thinks we ought to be able to arrive at a reliable method of gauging X-ray dosage.

Bordier¹ has elaborated a method based on the action of the rays on barium platino-cyanide, which readily changes from its original bright green to yellow, becomes darker yellow, gamboge, and deep maroon. The salt is suspended in collodion and placed on the part to be treated. The pastilles are square, with an adhesive back to facilitate attachment to the skin, and a scale of colours is supplied, with tints corresponding to the principal reactions required in X-ray treatment. It is claimed that so long as the pastille has not attained tint No. 1 it is impossible to produce a cutaneous lesion; and further, that the use of this instrument makes the use of the X-ray tube as easy and as safe as the stethoscope.

The above methods are none of them altogether satisfactory, and further developments will be watched with interest. The whole question is very fully dealt with in the *Archives of the Röntgen Ray* for June, 1906, by several well-known writers on X-ray subjects.

REFERENCE.—¹*Archiv. Röntgen Ray*, June, 1906.

X-RAY THERAPEUTICS.

The manner in which the X ray produces its effects on the tissues has been under investigation, with some notable results. Some interesting speculations and experiences are recorded by Hunter¹, chiefly of a general nature. According to Schultz and Hoffmann² the primary effects of X-rays are exerted on the epithelium.

Owing to the remarkable effects produced in the treatment of **Leucocythæmia**, the action of X rays on the blood has received much attention. There is a fairly widespread opinion among clinicians that the benefits derived from this form of treatment are due to a destructive action on the leucocytes, and that the same results are obtained no matter to what part of the body the rays are applied.

Curschmann and Gaupp³ conclude that through the action of the X ray there is formed in the blood of leukæmic patients a specific leucotoxin which has an elective action on the leucocytes. This theory is to a large extent borne out by Gramegna and Quadroni⁴, who suggest, as a result of their experiments, that radiotherapy might be tried in hæmophilia and in constitutional diseases with a tendency to hæmorrhage. Their observations showed an increase in the coagulability and density of the blood after exposure to X rays, which gave rise to the suggestion.

Arneth⁵, on the other hand, believes he has proved that in myelogenous leukæmia it is not a destructive process, but that there is, after the X rays, a lessened demand for white cells. He takes an unusual view of the leukæmic process, viz., that it is not only the expression of an immense leucocyte destruction and of a correspondingly great demand for new ones, but it is probable that a special stimulus is necessary for the hyperplastic development of the blood-forming organs—perhaps some still hypothetical virus.

Rosenberger⁶ made a series of analyses of the urine in two cases of leukæmia and one of pseudoleukæmia that were treated by means of the X ray, and concludes therefrom that the amount of uric acid is altered; but a similar effect has not been observed in other diseases. At the beginning of the treatment the amount of uric acid excreted is increased, and a decrease in this amount in the course of the treatment is a favourable prognostic omen. The excretion of the xanthin bases is increased during the treatment and its after-effects. In the case of pseudoleukæmia treated, the X rays were apparently not without effect on the spleen, though no curative tendency was noted and the uric acid excretion was not modified.

Jos. F. Smith⁷, in a very complete paper on this treatment of leukæmia, concludes:—

“1. The action of X rays seems to be of two kinds: (a) A local action in glands and spleen characterized by a breaking down of the lymphoid tissue; (b) The manufacture of toxins which have a selective action upon the mononuclear elements of the blood.

“2. In no cases has there been any benefit from the use of X rays in acute leukæmia.

“3. With the discontinuance of the X ray, the disease, after a longer or shorter period of time, tends to reassert itself.

“4. Death may take place when the blood-count is normal and the spleen and glands are smallest.

“5. The X ray holds the disease in abeyance, but probably is not curative. It is yet too soon to say that persistent treatment of

favourable cases may not give permanent relief. In any event there can be no doubt that the intelligent, persistent use of X rays offers more hope of relief to these patients than any and all other methods of treatment combined, and that X rays will have a permanent place in the therapy of this serious disease."

These conclusions almost exactly coincide with the results of our own experience in the treatment of this disease by X rays, and may be said to summarize the present position of the subject.

The following papers, among many excellent ones which have appeared, may be referred to with advantage: "Leucocythæmia treated by the X rays, with a record of four cases," C. H. Melland, M.D.⁸; "Two cases of Leukæmia treated by the Röntgen Rays," W. Ironside Bruce, M.D.⁹; "The treatment of Leukæmia and Pseudo-leukæmia by the Röntgen Rays, with reports of cases," Arthur Holding, M.D., and Mortimer Warren, M.D.¹⁰; "A case of Leucocythæmia treated by X rays," W. B. Ransom, M.D., etc.¹¹; "X rays in Leukæmia," by Byrom Bramwell¹².

MALIGNANT DISEASE.

It cannot be said that any special advance has been made in the X-ray treatment of this class of disorder, beyond what was known at the time of writing last year. Numerous cases have been reported in which good results were obtained, for a time at least. Taking all the cases of malignant disease referred for X-ray treatment, the proportion of cures or apparent cures is very small, due, in great part, to the fact that most are beyond hope of recovery before the treatment has commenced.

Carcinoma.—Pusey¹³ has contributed an excellent paper on "The uses of X rays in Carcinoma." In reading this, one cannot help thinking he must have been very fortunate in his cases to have obtained such a large proportion of good results. In two cases, where death from intercurrent disease made a post-mortem examination of the part treated possible, the cancerous tissue was converted into a mass of healthy scar tissue, and the patients were to all appearances cured of the malignant disease. Other favourable cases are quoted, and on the whole the paper makes very encouraging reading.

Marmaduke Shield and Lewis Jones¹⁴ give details of a very instructive case of apparent recovery, where the outlook was most unfavourable. The right breast and axilla were involved, and a free operation was performed; further operations were done six and nine months afterwards. The case now became so unfavourable as regards operative procedure that the patient was referred to Lewis Jones for X-ray treatment. Fifteen months after the original operation, the patient was symptomatically cured.

Tousey¹⁵ reports a case of cancer of male breast cured by the Röntgen rays. This case had been examined microscopically and its malignancy proved. There had been no sign of recurrence up to thirteen months afterwards.

Stegman¹⁶ cites a favourable influence of the rays on malignant metastases in the cervical glands.

Wendel¹⁷ reports a case of malignant stricture of the œsophagus in which great benefit was derived from the employment of X rays through the œsophagoscope. At the same time, quinine and arseniate of soda were given hypodermically.

Pfahler¹⁸ mentions six cases of mediastinal carcinoma treated by X rays, in three of which apparent recovery took place.

Williams¹⁹ reports a series of cases in which encouraging results have been obtained.

Knox²⁰ describes a very interesting case of epithelioma of the tongue, with secondary growths in the glands of the neck and the liver, treated by X rays. The interest of the case lies in the apparent arrest of the primary growth, and the changes occurring in the cervical glands. The post-mortem and histological changes are minutely described and illustrated—the whole case constituting a valuable contribution to the scientific aspect of the subject.

Sarcoma.—The X-ray treatment of this form of malignant disease continues to be unsatisfactory, and to be influenced by no regular rules, so far as we can ascertain. On rare occasions one encounters a case which does surprisingly well for a time, but the great majority are scarcely, if at all, improved, while the few which do well under treatment tend to recur at no very distant date. Bull²¹ gives detailed reports of ten inoperable cases of malignant disease of the orbit treated by the X ray—all but one of these were sarcomata. Two cases—one of sarcoma and one of carcinoma—were very much improved. The remaining eight cases were not influenced by the treatment except as regards the alleviation of pain. As bearing on this subject an interesting paper by Ring²² may be referred to with advantage.

The case for the X-ray treatment of sarcoma is admirably dealt with in a paper read by Coley²³ before the American Röntgen Ray Society in 1905, and his conclusions may be taken to represent very accurately the present state of our knowledge of the matter.

Zum Busch²⁴ reports a case of mediastinal sarcoma apparently cured by X-ray treatment.

SKIN DISEASES.

The X rays are being more and more employed in the treatment of diseases of the skin, and the method is particularly valuable in many of those conditions which are very resistant to ordinary applications. Many hospitals are installing apparatus for this work, and it is quite usual to find dermatologists, whose practice is in any way extensive, with a complete set for treating their own patients. Probably in no disease has the X ray worked so complete a revolution as in the treatment of **Ringworm**. Further experience has made the applications more exact, ensuring complete epilation without risk of a troublesome dermatitis. The technique will be found fully described in papers by Macleod²⁵ and Sequeira²⁶.

In the treatment of **Psoriasis**, X rays do not seem to possess any advantage, as regards permanency, over other methods, but it is at least equally efficient in removing the signs of the disease, and it is infinitely more pleasant and easy for the patient. In the few cases we ourselves have treated, the patches have cleared up in a remarkable manner, remaining so for some months. There seems reason to believe that if the treatment were carried on for some time after the disappearance of the patches, and then occasionally applied over likely places, some degree of permanency might be obtained.

Mycosis Fungoides is another obstinate condition which is at times very amenable to X-ray treatment. Successful cases are reported by Taylor²⁷ and Worrall²⁸.

Those interested in the use of X rays in skin diseases will find much valuable information of a general nature in papers which have been published by Marshall²⁹ and Wise³⁰.

As regards the treatment of **Rodent Ulcer** and certain forms of **Lupus**, we have nothing to add to what was said in this section of the last volume. The employment of X rays is a matter of routine.

Pfahler³¹ reports a case of **Chronic Pyogenic Onychitis** cured by the X ray.

MISCELLANEOUS DISEASES.

Caracelli and Lucaselli³² report two cases of **Enlarged Prostate** in men over sixty which were much improved by X-ray treatment. The rays were applied to the perineum, the genital organs and surrounding parts being protected by sheet lead. The authors do not consider a rectal tube necessary. The improvement in these cases was maintained a year after treatment was suspended.

Hartzell³³ believes that in the persistent use of X rays we have a complete cure of **Paget's Disease** of the nipple, where the ducts and glands are not involved. We have a case which has been under treatment for nearly two years, more or less regularly, which now seems to be quite cured.

In **Tubercular Adenitis** we have successful cases reported by Hendrix³⁴ and Pfahler³⁵; and the effect upon glandular tissue of exposure to X rays is well described in a paper by Taylor³⁶. Coyle³⁷ has had very satisfactory results in the treatment of **Carbuncle** by X rays.

The frequently observed influence of the X rays on painful conditions has prompted some workers to try their influence in cases of **Neuralgia**, and the results have been at times exceedingly satisfactory, notably in the hands of Leonard³⁸ and Gramegna³⁹.

Pfahler and Thrush⁴⁰ report a case of **Exophthalmic Goitre** which has been apparently cured by X rays, and the paper also gives a summary of the cases similarly treated up to the time of writing.

McGuire⁴¹ reports two cases of **Varicose Veins** successfully treated by the X ray. The rays were applied with a view to promoting the healing of a varicose ulcer. A mild reaction was produced, and as this subsided the varicose veins gradually contracted in size and finally

disappeared. This, so far as we know, is the first case of the kind to be reported, and is welcome as a valuable addition to the already long list of diseases in which the X rays are of use.

Cleveland⁴² has found the X rays useful in the treatment of **Chilblains**.

With all the evidence now obtainable as to the power of X rays to work harm in the hands of unskilled or unprincipled persons, it seems the time has now come for the authorities to seriously consider the question of placing the employment of X rays upon a proper basis. Apart from the danger of producing serious dermatitis by unskilled persons—as witness some cases before the law courts recently, both in this country and abroad—there is the effect on the reproductive organs, which may become a serious matter, as touching one of the most important social questions of the day. The first step in drawing attention to this matter, in this country at least, has been taken by the British Electrotherapeutic Society, who passed the following resolution, copies of which were sent to the medical press and various members of both Houses of Parliament: “It having been established that the use of X and other rays by persons without a registered qualification constitutes a grave social and public danger, and that medical men alone are capable of administering such rays to the public benefit, this Society is of opinion that the use of the X and other rays should be by Act of Parliament confined absolutely to registered medical practitioners, and to dental surgeons in the practice of dental surgery.”

Eminently desirable as such a step seems to be, it is an unfortunate fact that medical matters are not popular with the British Government, and, coupled with the absence of a distinct precedent for such a step, it is not likely that anything will be done before the danger has become both real and extensive.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Mar. 1906; ²*Deut. Zeit. f. Chir.*, in *Ther. Gaz.* Dec. 15, 1905; ³*Münch. med. Woch.* Dec. 12, 1905; ⁴*Arch. Gén. de Méd.* Oct. 10, 1905, in *Brit. Med. Jour.* Jan. 6, 1906; ⁵*Münch. med. Woch.* Sept. 26, 1905, in *Med. Chron.* Jan. 1906; ⁶*Münch. med. Woch.* Jan. 30, 1906; ⁷*Trans. Amer. Röntgen Ray Soc.* 1905; ⁸*Brit. Med. Jour.* July 1, 1905; ⁹*Lancet*, Jan. 27, 1906; ¹⁰*New York Med. Jour.* Nov. 11, 1905; ¹¹*Brit. Med. Jour.* Mar. 17, 1906; ¹²*Clinical Studies*, in *Brit. Med. Jour.* July 29, 1905; ¹³*Ann. Surg.* Dec. 1905; ¹⁴*Lancet*, Nov. 18, 1905; ¹⁵*Med. Rec.* July 29, 1905; ¹⁶*Münch. med. Woch.* June 27, 1905; ¹⁷*Ibid.* Dec. 19, 1905; ¹⁸*Amer. Med.* Feb. 10, 1906, in *Brit. Med. Jour.* Mar. 31, 1906; ¹⁹*Lancet*, Nov. 14, 1905; ²⁰*Ibid.* June 22, 1906; ²¹*Med. Rec.* June 24, 1905; ²²*Trans. Amer. Röntgen Ray Soc.* 1905; ²³*Brit. Med. Jour.* July 1, 1905; ²⁴*Ibid.* Mar. 31, 1906; ²⁵*Ibid.* July 21, 1906; ²⁶*Ibid.* July 28, 1906; ²⁷*Lancet*, Mar. 24, 1906; ²⁸*Med. Electrol. and Radiol.* July, 1906; ²⁹*Treatment*, April, 1905; ³⁰*Med. Rec.* Jan. 20, 1906; ³¹*Amer. Jour. Med. Sci.* April, 1906; ³²*Gaz. deg. Osped.* Jan. 18, 1905, in *Brit. Med. Jour.* July 29, 1905; ³³*Med. Rec.* Mar. 3, 1906; ³⁴*La Polycl.* June 15, 1905, in *Lancet*, Aug. 5, 1905; ³⁵*Ther. Gaz.* Jan. 15, 1905; ³⁶*Ann. Surg.* Mar. 1906; ³⁷*Med. Electrol. and Radiol.* June, 1906; ³⁸*Amer. Med.* July 8, 1905; ³⁹*Rif. Med.* Dec. 9, 1905, in *Brit. Med. Jour.* Feb. 10, 1906; ⁴⁰*Ther. Gaz.* Mar. 15, 1906; ⁴¹*Med. Rec.* Sept. 1, 1906; ⁴²*Med. Electrol. and Radiol.* Sept. 1906.

TREATMENT BY RADIUM.

Radium is being more or less constantly used for therapeutic purposes, but nothing has occurred during the past year to alter our opinion that radium is useful therapeutically by virtue only of the X rays it gives off, and that it is inferior to the X-ray tube where the latter is admissible.

London¹ has recorded the effect on rabbits after keeping them for sixteen months in a cage in the centre of which was suspended 25 mgrams of radium bromide. After sixteen days, hyperæmia of ears appeared, followed by loss of hair, ulcers, and a general apathy and slowness of movement. The spleen was shrunk to one-fourth its usual size, liver was fatty, kidneys showed cellular atrophy, and there were no spermatozoa found in the testes. There were also found atrophied ganglionic cells in the nervous system.

On account of the enormous cost and limited supply of radium, attempts have been made to communicate its radio-active properties to other bodies, which might then, to some extent, answer the same purpose. Axmann² has described a substance to which he has given the name of radiophor, which may be used to coat catheters, probes, needles, or plates for surface applications. Applied to the skin, the reaction becomes visible after two hours with some samples of the preparation. A similar end is obtained by Lieber³, who has described a method of making radium coatings for therapeutic use. His method is to dissolve radium in a suitable volatile solvent, in which solution any desired applicator is dipped. This, when dried, has a thin film of radium, the accidental removal of which is prevented by a subsequent coating of collodion. Both the radium and collodion solutions are stained with an aniline dye, so as to indicate which part is coated, as well as the accidental removal of such coating. Such radium coatings are found to be very active, owing to the very little, if any, absorption of the rays by the collodion layer. They can be adapted to any part of the body, and are easily sterilized, since the protective layer resists even continual boiling.

Schmidt⁴ calls attention to the fact that very undesirable after-effects may appear long after the application of radium rays, such as skin atrophy, white scar, and telangiectasis, so that in attempting to treat nævi, hypertrichosis, etc., the cure may be worse than the disease.

In **Trachoma**, radium does not seem to be of much value, which is not what one would expect after the beneficial effect of X-ray applications in this disease. The results of the treatment of eight cases by radium have been recorded by Jacoby⁵.

Pochon⁶ reports the cure of a case of **Actinomycosis** of the lobe of the ear by means of radium applications.

Cases of localized **Epithelioma** of small size, which were cured by radium, are reported by Rehns⁷ and Salmon.

Max Einhorn⁸ describes his method of treating **Œsophageal Cancer** by means of radium. He mounts his radium vial on the end of a flexible rubber tube, which is passed down to the stricture, where it

remains for from thirty to sixty minutes. Later⁹ he reports on seven new cases of this disease in which this method was employed, applications being made as a rule for one hour daily. In all cases except one, great improvement followed in the patients' general and local condition; in one the stricture had apparently disappeared.

Darier¹⁰ had good results in the treatment of **Carcinoma** of the alæ of the nose.

Manby¹¹ and Heinatz¹² report cases of **Rodent Ulcer** successfully treated by radium. These, however, present no special features, since for such cases the use of radium is a matter of routine.

A paper by Abbe¹³ should be referred to for further information as to the value of this agent in therapeutics.

REFERENCES.—¹*Berl. klin. Woch.* 1905, No. 42, in *Med. Press*, Jan. 24, 1906; ²*Deut. med. Woch.* in *Lancet*, Jan. 13, 1906; ³*Jour. of Soc. of Chem. Industry*, in *Lancet*, Aug. 19, 1905; ⁴*Deut. med. Woch.* Oct. 24 and 31, 1905; ⁵*Ibid.* Jan. 11, 1906; ⁶*Lancet*, Jan. 13, 1906; ⁷*Le Radium*, July, 1905; ⁸*Brit. Med. Jour.* Aug. 19, 1905; ⁹*Berl. klin. Woch.* 1905, No. 44a, in *Brit. Med. Jour.* Jan. 6, 1906; ¹⁰*Clinique Ophthalm.* July 25, 1905, in *Lancet*, Aug. 19, 1906; ¹¹*Brit. Med. Jour.* July 1, 1905; ¹²*Roussky Vrach*, Oct. 1, 1905; ¹³*Med. Rec.* Jan. 6, 1906.

ELECTROTHERAPEUTICS.

In this branch of treatment the past year's work has not been productive of any new discovery, but rather the further development of methods already known. The present position of electrotherapeutics is very well stated in the Hunterian lecture delivered by Dr. Lewis Jones¹, in which special reference is made to the newer lines of work. Leduc² continues to follow up his invaluable work on the "Ions in Therapeutics," and has made considerable additions to the value of the electrolytic process in therapeutics.

Dickson³ has made a communication on the treatment of **Nævi** and other embryonic growths by electrolysis. We ourselves can quite endorse the value of the method, when skilfully used, in cases which at the outset are most unpromising. At the London Hospital Electrical Department about four hundred cases have been treated during the last three and a half years, and the results have been most satisfactory in every way. The only instruments used are a bipolar needle-holder—which holds from two to five needles as required—and a fine galvanocautery point. As a result of our experience it is very unusual to meet with a case of nævus that cannot be satisfactorily removed by one or other, or both, of these instruments. An indifferent electrode is seldom, if ever, used, the current being confined to the area involved.

Cataphoresis by means of soluble zinc and mercury electrodes is gradually finding a greater field of usefulness, especially in the treatment of **New Growths**. Some valuable hints on this will be found in *Medical Electrolgy and Radiology*, August, 1906, by Arthur, Tayler, and Marsh. We have for long considered that the full surgical use of metallic electrolysis in the treatment of malignant

growths has never been taken advantage of, and the paper by Marsh indicates one way by which this may be attained.

Potts⁴ has had good results in the treatment of the **Secondary Contractures of Hemiplegia**—his scheme being to produce a state of anelectrotonus in the contracted muscles.

Allard⁵ finds the faradic current useful in **Obesity**. His electrode, being a roller which is rapidly vibrated by means of an electric motor, gives a combination of faradism and vibration.

Cleveland⁶ reports four cases of **Ataxy** which were much improved by faradism. The current was applied to the hands or feet through the medium of water. In a fifth case no improvement resulted.

Lebon⁷ recommends electrical irrigation for cases of **Intestinal Obstruction** which resist ordinary treatment by enemata and drugs; and Webb⁸ reports a case of obstinate **Colitis** successfully treated by means of electric enemata—the solution used having a proportion of 0·1 per cent of nitrate of silver.

High-frequency currents, while gradually settling down to their proper place in medicine, continue to receive a fair amount of attention in the medical press. The method also continues to be exploited in the most wholesale fashion in numerous quack establishments all over the country. It is much to be deplored that nothing can be done to check the enormous amount of barefaced fraud to which the public is subjected in the name of electrical treatment, whether it takes the form of sumptuously furnished electrical quack establishments, or the sale of that most successful and time-honoured swindle—the electric belt. In spite of the revelations of the past, the public are just as easily and as successfully imposed upon as ever they were, by almost any form of electric belt. In a case⁹ we assisted in investigating recently, a belt made up of half a dozen small dry cells, costing about ninepence each, was being readily sold for *fifteen guineas*—and such will go on so long as the Government declines to interfere with the inalienable right of every British citizen to be humbugged by these unscrupulous persons.

Foulerton¹⁰ and Kellas have investigated the action of high-frequency currents on bacteria, and their conclusions go to show that any germicidal action they may have is due to the action of substances formed as the result of electrical action on the atmosphere in which the discharge occurred, and it appeared, under the time conditions of the experiments, that the electrical force employed was not capable of exercising any injurious action on the bacteria tested. It is probable that when cases of lupus, and certain other cases in which there is an exposed ulcerated surface, are treated by high-frequency discharges, the results produced are due entirely to the action on bacteria of nitrous and nitric acids formed in the neighbouring air. From a therapeutic point of view the use of high-frequency discharges in such cases must be looked upon mainly as an efficient method for bringing germicidal substances in a nascent, and very active condition, into contact with the bacteria present in the lesion exposed to the action of the discharge.

Somerville¹¹ has made some careful investigations on the influence of these currents on the surface temperature, and his paper will well repay perusal. The surface temperature always rises during the application, due apparently to dilatation of the cutaneous capillaries, and this no doubt explains their action in reducing blood-pressure, referred to in the *Annual* last year.

Bonnefoy¹² has had good results in the treatment of **Tuberculous Testicle** by means of the local application of high-frequency currents. Mackie¹³ has also found the high-frequency spark very useful in the treatment of chancroidal, herpetic, and varicose **Ulcerations**.

On the whole, the work of the past year goes to bear out our statement made in this place last year, that the greatest value of the high-frequency current will be found in its use as a local application.

REFERENCES.—¹*Brit. Med. Jour.* Oct. 21, 1905; ²*Ibid.* July 28, 1906; ³*Canad. Jour. Med. and Surg.* Feb. 1906; ⁴*Ther. Gaz.* Dec. 15, 1905; ⁵*Amer. Jour. Med. Sci.* Oct. 1905; ⁶*Med. Electrol. and Radiol.* Sept. 1906; ⁷*La Clinica*, Jan. 19, 1906, in *Brit. Med. Jour.* May 19, 1906; ⁸*Lancet*, Nov. 4, 1905; ⁹*Ibid.* June 9, 1906; ¹⁰*Ibid.* May 19, 1906; ¹¹*Med. Electrol. and Radiol.* May, 1906; ¹²*Sem. Méd.* May 16, 1906; ¹³*Jour. Cut. Dis.* Dec. 1905.

Part II.—The Dictionary of Treatment.

A REVIEW OF MEDICAL AND SURGICAL PROGRESS
FOR 1906.

BY MANY CONTRIBUTORS.

GENERAL REVIEW.

MEDICINE.—The most hopeful direction in which to look for advances in general medicine at present seems to be along the line of vaccine or "opsonic" treatment, and much interest in this department of research has been manifested during the past year. So far the results obtained seem to promise more in surgical than in strictly medical affections, and it may prove that the physician will, by the aid of this weapon, win back in the future much of the territory which has been gained from him by the surgeon. It is too soon, however, to arrive at any definite conclusions, but the present issue of the *Annual* contains a review of the whole subject, and an account of the results which it has yielded so far.

In the department of cardiac disease much progress is being made in differentiating the forms of myocardial failure by a study of the particular physiological function of the heart muscle affected. The accurate instrumental methods introduced by Dr. Mackenzie, of Burnley, in this country, and by Wenckebach, and others, in Germany, have done much to facilitate this work, and before long their results will, no doubt, bring about distinct advances in the treatment of heart failure. The more general use of the sphygmometer in clinical work is also contributing largely to a better understanding of circulatory disorders, and to the introduction of more rational therapeutics.

In the sphere of gastro-intestinal diseases the centre of gravity of interest seems rather to have shifted during the past year from the stomach to the colon; and rapid progress is being made in the more accurate diagnosis and treatment of diseases of the large bowel. We would direct special attention to the article on "Colitis," in which some important recent papers on this subject are summarized. [R. H.]

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SURGERY.—There is no striking advance to be recorded in the department of general surgery. Many attempts have been made to find a local and spinal anæsthetic which shall be efficient and at the same time practically free from danger. There are points of similarity between the search for such an anæsthetic and that for

the *elixir vitæ*. At present stovaine holds the field as being quite as powerful and much less toxic than any other of the local anæsthetics. It has given very good results in some hands, but some advise care in its administration by intraspinal injection.

Good work has been done on brain tumours from a surgical point of view, and Horsley gave a very interesting and useful address on the operative technique of cerebral tumours. There is still some discussion as to the best method of opening the skull and closing cranial defects which have followed accidents or are the results of trephining.

As regards operative procedure for cancer, no advance has been made, except that evidence has accumulated that wide removal is necessary if good results are to be obtained; and Mr. Butlin draws attention to the possibility of many of the so-called pre-cancerous conditions actually being the first stages of cancer. He gives notes and illustrations of several cases supporting this contention.

Cases of successful and unsuccessful intervention in cardiac wounds are recorded.

Many papers have appeared in support of Bier's treatment of various inflammatory conditions by means of passive congestion. It is somewhat difficult to judge how far some of the reports are coloured by too great an enthusiasm for a new treatment, and it is certainly wiser not to treat such cases as out-patients, as is recommended by some surgeons.

The Cavendish Lecture by Sir Wm. Macewen "On some points in the Surgery of the Lung" is of great interest.—[P. L.]

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ANÆSTHESIA.—The progress to be noticed during the past year is in two main directions. First, some valuable experimental work has increased our definite knowledge with regard to the action of chloroform upon the organism and has scientifically corroborated the interpretation of certain clinical phenomena; and secondly, increased experience with ethyl chloride enables us to assign its place more accurately in the list of trustworthy anæsthetic drugs. With regard to the latter we may say confidently that ethyl chloride has shown itself a more dangerous drug than was at first supposed. The list of published fatalities alone is now a formidable one, and it is certainly to be regretted that the first recent accounts of ethyl chloride anæsthesia led to the quite erroneous impression that we had to do with another anæsthetic comparable in all respects with nitrous oxide gas. Experience shows that the two drugs are in quite different categories as regards safety and as regards after-effects. Concerning the question of safety, indeed, the latest and best justified estimates place ethyl chloride in a position much nearer to that of chloroform than to that of laughing-gas.

The highly dangerous, and fortunately rare, symptoms classed under the name of "delayed chloroform poisoning" have also given rise to some literature during the past year. These phenomena are still

unexplained, for there is at present no adequate reason shown why they should follow inhalation in one case and not in another. Moreover, instances have been forthcoming in which the same train of symptoms has followed upon an inhalation, not of chloroform at all, but of ether. There appears to be a close relationship between the appearance of these after-effects and the presence of acetone in the urine of the anæsthetized subject. The cases are thus brought more or less into line with those in which diabetic subjects, in whose urine acetone is also present, perish from coma after inhalation of anæsthetics. In each case treatment before administration should be directed towards the diminution in the urine of deleterious substances. It has been recognized before, that in the case of diabetics efforts should be made to reduce the sugar present to the lowest possible amount if an anæsthetic is to be administered, and we must now apply similar caution in cases of acetonuria. Some authorities, however, regard the acetone as a mere by-product of the hepatic toxæmia which is the cause of death.

Those who have made an extended trial of anæsthesia by means of combined scopolamine and morphine appear to have arrived definitely at the conclusion that though extremely valuable as a preliminary to chloroform and to ether, the combination of these drugs is not in itself to be relied on as an anæsthetic. Seelig, of St. Louis, who reports sixty-five cases of scopolamine-morphine and ether narcosis, says that he has never seen results by other means which approximate to those obtained in this way.—[J. B.]

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CANCER.—The work done recently in connection with the *causation* of cancer has been critical rather than constructive. The forms of cell-division in cancer described by Farmer, Moore, and Walker, and held by them to be a criterion of malignancy, have been found by Victor Bonney, working in the Cancer Research Laboratories of the Middlesex Hospital, to occur in non-malignant tissues. Bashford and Murray now hold that the gametoid mitoses of cancer bear only a superficial and misleading resemblance to the gametic mitoses of the reproductive tissues. Greenough has shown that Plimmer's bodies are probably vacuoles containing secretory products of the cancer cell. The occurrence of micrococci (*Micrococcus neoformans*) in cancerous and other tumours, observed by Doyen, has been confirmed by other investigators. But they are not constantly present, and their etiological relationship to the tumour is very doubtful. Paine and Morgan have found streptococci in a certain percentage of tumours. Lazarus-Barlow and Gordon Taylor have investigated the incidence of cancer from London hospital statistics, and find that it is increasing in men, while, at the present time, it is stationary in women. It has been found by the workers of the Imperial Cancer Research Fund, and by foreign observers, that mice which have spontaneously recovered from mouse-carcinoma are immune to further inoculations.

Professor Moore, of the Liverpool Cancer Research Laboratory, makes the important statement that a decrease or disappearance of hydrochloric acid from the gastric juice occurs, not only in gastric cancer, but also in carcinoma of other organs. A. G. R. Foulerton has made some interesting observations on chondrification of the stroma in carcinoma.

The writer has continued his researches on permeation and the other processes of dissemination in breast-cancer. A detailed study, on similar lines, of the mode of dissemination of malignant growths arising in other organs, would in all probability do much to rationalize operative treatment and to improve its results.

Broadly speaking, excision remains the only reliable method of dealing with malignant growths. Doyen's serum, like that of Schmidt, has proved entirely useless. An important paper by Coley shows, however, that Coley's fluid has attained some amount of success in the treatment of inoperable sarcoma.—[W. S. H.]

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DISEASES OF CHILDREN.—In the feeding of infants there has been but little advance during the past year. An interesting study of the effects of lactation during pregnancy was made by Fordyce, who concludes that the unborn infant is likely to suffer seriously if suckling overlaps pregnancy. Conception occurs only occasionally before the eighth month of suckling, although menstruation often begins much sooner; therefore Fordyce urges that suckling should not be prolonged beyond the eighth month. Evidence is accumulating of the great value of sodium citrate as an addition to cow's milk to facilitate the digestion of the curd, but discordant views have been published recently as to the manner in which this assistance is effected. Goat's milk is being advocated strongly as a food for infants; its cheapness, its richness, and its comparative immunity from tuberculous infection are the grounds of its recommendation.

In the treatment of infantile diarrhœa, tachiol, an aqueous solution of fluoride of silver, is now recommended; cyllin also, a powerful antiseptic somewhat resembling creolin, is said to be useful.

Around the treatment of congenital hypertrophy of the pylorus there still rages a strenuous fight, the surgeons on the one hand proclaiming the successes and advantages or even absolute necessity of operation; whilst physicians on the other hand have recorded many cases cured by simple stomach-washing, or even by very careful feeding, and throwing doubt on the justifiability of operation except in a small proportion of the cases.

In the treatment of marasmus the use of stout is advocated as an alcoholic solution of dextrins, which, with the addition of some cream, hot water, and beef juice, makes a very valuable food for extremely emaciated infants for a few days.

Chorea is constantly a field for experiment with new drugs and old. Chloralamide has recently been used with success in severe cases, and

in these cases also sulphonal has proved useful. More successes with aspirin are recorded.

Whooping cough is another disease in which new drugs are still being tried. Vaporin, a mixture of naphthalin with oils, is being used for inhalation, and terpinol is also advocated. Chloroform narcosis has been found effectual in alleviating or stopping the paroxysms. A simple method of treatment has been strongly advocated by Stephens: the ears are syringed daily with boracic acid, and then painted with a 5-10 per cent solution of cocaine: very striking success is claimed for this method of treatment.—[G. F. S.]

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INFECTIVE FEVERS.—The republication in a volume of selected essays by the New Sydenham Society, of Calkins and Councilman's papers on the pathology of small-pox, has brought the important work of these observers within reach of English practitioners. A short account of these researches is given in the article on small-pox.

In typhoid fever Ewart has suggested a form of diet and method of treatment which appear to be worthy of trial.

Otherwise advances in knowledge of these fevers have recently been made, not so much in therapeutics as in etiology, diagnosis, and pathology. But history warrants us in saying that increased knowledge in these departments leads to improved treatment, and also to what is better than treatment, prevention. Hence it is that we have dwelt in some detail on the pathology of these diseases.—[E. W. G.]

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INSANITY.—Where so much still remains to be known, in regard not only to the etiology and pathology of insanity but also to the constituent mechanism and mode of working of the organ of mind itself, it is not surprising that advance in the curative treatment is slow. The chief progress in recent years has been the more complete adoption of hospital methods in asylums and similar institutions. The next step will be the clinical investigation and treatment of mental disorders by competent observers in the general hospitals attached to the medical schools of the country; and thereby the closer alliance at the centres of medical research of psychiatry with neurology, and with the study and treatment of diseases generally. Although there has been no notable discovery during the past year in the treatment of insanity, many important scientific papers have appeared, which deserve careful perusal by the practical neurologist and psychiatrist. Special attention has been devoted to the subjects of general paralysis, dementia præcox, alcoholism, epilepsy, chorea, idiocy and imbecility, and brain tumours in relation to mental symptoms. Other papers covering a wider field are those on "The Pathological Investigation of the Causation of Insanity," by F. W. Mott; on "Amentia and Dementia," by J. S. Bolton; on "Dendrites and Disease," and other

papers, by Sir W. R. Gowers ; on "The Neuron Theory : Fatigue, Rest and Sleep," by W. Bevan Lewis : also Professor Pawlow's Huxley Lecture on the scientific investigation of the psychical processes in higher animals : Professor Gotch's presidential address to the section of physiology at the York meeting of the British Association, on "The Nature of Nervous Processes : " and, finally, Professor Grasset's able presidential address at the Lille Congress of French Alienists and Neurologists, on "The Inseparable Union of Neurology and Psychiatry in the Study of Diseases of the Nervous System of Man."—[C. C. E.]

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OBSTETRICS AND GYNÆCOLOGY.—The number of important publications dealing with obstetrical and gynæcological subjects is distinctly less than last year. Notwithstanding this, solid advances have been made in many directions.

The interest in uterine myomata is sustained, and several valuable contributions have been made bearing on the indications for the appropriate treatment of these tumours. These papers, founded on long series of cases, all tend towards early operation when symptoms due to the tumour declare themselves. As to the particular operation to be employed, subtotal hysterectomy is still the procedure of election in most cases.

The question as to the liability of the myomatous uterus to cancer, either of body or cervix, continues to stimulate research, and much evidence bearing on this important question has been brought forward.

The visceral degenerations said to be associated with these tumours have been studied anew, and questions concerning the best treatment for them when associated with pregnancy have exercised the pens of several writers.

Further evidence is also forthcoming on the important subject of uterine cancer, especially in regard to the advantages of abdominal over vaginal extirpation.

Various papers on the treatment of uterine displacements are noticed in the article devoted to diseases of that organ.

A suggestive paper on metastatic carcinoma of the ovaries has appeared.

Of the subjects bearing on pregnancy, the peculiar form of pyelonephritis associated with child-bearing has been minutely investigated. Many important contributions to the study of the toxæmias of pregnancy have appeared, notable amongst them being papers by Whitridge Williams and Liepmann. The clinical aspects of chorea and mitral stenosis in pregnancy have been exhaustively reviewed by French and Hicks.

Much interest was aroused by a paper on the treatment of normal labour by a well-known English authority, in which a plea was made for a fuller recognition of the *vis medicatrix naturæ*, and the too ready use of artificial aid, instrumental or otherwise, was deprecated. Several other papers tending in the same direction have also appeared.

On the Continent, the practice and results of pubiotomy for contracted pelvis have been fully discussed.

The operative treatment of puerperal infections of the uterus has been the subject of much valuable expression of opinion, which will repay perusal by those interested in the latest advances of obstetric surgery.—[A. E. G. and V. B.]

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OPHTHALMOLOGY.—The conditions that the ophthalmic surgeon has to deal with may be roughly divided into three classes:—

1. Errors of refraction and muscular balance. Here, treatment by appropriate glasses has for some time been brought to a high degree of excellence, which would seem to leave little room for advance and the differences of opinion that advance implies, except in the case of myopia, the palliative treatment of which is differently carried out by different surgeons, and the operative treatment of which is discussed later in the present volume.

2. Diseases confined to the eye. The general principles of treatment have undergone little change for many years, though the details of their application are much discussed. Thus, the salts of silver are universally recognized as being the most efficient remedies for purulent conjunctivitis, but the question as to the relative merits of the various salts of silver is still under discussion. Again, the general principles of cataract extraction and after-treatment are universally agreed on, but there is the utmost divergence of practice as to details, and the same is true to a less extent of the operative treatment of glaucoma. There is only one *method* of treatment for eye diseases as to which authorities are very seriously divided, viz., subconjunctival injections.

3. Eye diseases which form or may form part of a general infection. Besides syphilitic, gonorrhœal, and tubercular affections of the eye, there are other conditions in which toxins may be developed, which may cause optic neuritis, iritis, or cyclitis. About these general infections we have at present very little exact knowledge: its increase would probably lead to an advance in therapeutics. As yet the rôle of serumtherapy and similar methods in eye diseases is practically confined to the occasional injection of the "new" tuberculin, and the injection of antitoxin in conjunctival diphtheria. Römer's anti-pneumococcic serum as a prophylactic or cure for corneal ulcers caused by pneumococci does not seem likely to be generally adopted, since local treatment of this affection is, on the whole, very efficient. Nevertheless, it is by studying the pathology of the eye in connection with that of the blood and of the whole organism, that the most important future advances may be made both in knowledge and treatment of diseases of this organ.—[A. H. T.]

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SYPHILIS.—There is accumulating evidence in favour of the *Spirochæta pallida* being the long-sought germ of syphilis. Much work must yet be accomplished, work that relates to the very foundation of the claim, before the Schaudinn-Hoffmann body can be accepted as the etiological factor of syphilis.

The organism has been found in the primary lesion and in the enlarged glands that accompany it. It has been demonstrated in the blood, spleen, and liver, and in the macules and papules of the skin, and the mucous plaques and condylomata of the secondary stage. It has been found in the lesions of the tertiary stage by a few observers, and has been searched for in vain by others. It has been found in congenital syphilis as in secondary acquired syphilis, and it has been seen in the large decidual cells of the placenta. Moreover it has been observed in the primary lesions in artificial syphilis in apes.

But when these facts are accepted, it does not follow that they constitute absolute proof that the *Spirochæta pallida* is the cause of syphilis. The spirochæte does not occur alone, nor is it present in great numbers in many of the lesions. It is difficult to distinguish from other spiral bodies, and the proof is incomplete from the bacteriologist's point of view that this body is the cause of syphilis.

[J. W. T. W.]

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TROPICAL DISEASES.—One of the most important results obtained during the year 1906 is the establishment, by the English Plague Commission working in Bombay, of the fact, on definite experimental evidence, that fleas (*P. cheopis*) actually can transmit plague from rat (*M. rattus*) to rat. The results of Simond (1898), Gauthier, and Raybaud (1902) are thus completely confirmed. So far only the results of preliminary work have been published, so that we must wait for the complete experiments as to the conditions which determine the spread of plague by this means; but the influence on prophylactic sanitary measures will undoubtedly be immense.

Another important discovery, if it be true, is that of the specific organism of beri-beri, viz., Tsuzuki's coccus, but we shall not be accused of excessive scepticism if we await further confirmation before accepting it, as so many "specific" organisms of beri-beri have already passed into the limbo of mere historical interest.

The English Commission on Sleeping Sickness, working in Uganda, have come to the conclusion that the mode of transmission of the specific organism (*T. gambiense*) is purely that of contamination, i.e., mechanical transference from the sick to the healthy, and that there is no developmental cycle in the fly (*G! palpalis*). But little advance has been made in the treatment of sleeping sickness, though the question is now being closely studied in animals from the standpoint of the organic constitution of various aniline dyes.

The nature of spirochætes is now a matter of keen dispute, and the

question as to their bacterial or protozoal nature is still unsettled. That piroplasmata undergo a development in ticks we pointed out last year. Koch's work has just been confirmed in India, though the results are not as yet published. The number of trypanosomes still grows, and it will take some time before order is established in the chaos of names that now exists, and before the specificity of every newly discovered trypanosome can be established. To some extent the same is occurring with spirochetes.

The number of hæmogregarines likewise grows, and about six are known in mammalian blood. These parasites are as yet but little understood, but it is probable that the elucidation of their life histories may throw light on many problems in tropical parasitology.

Evidence is accumulating that the treatment of bacillary dysentery by sera is of great value. It is almost imperative that this mode of treatment should be used in bacillary cases, and it is very necessary that the distinction between these forms and the amœbic forms be made, either by examination of the stools for *Entamœba histolytica* (see *Med. Annual*, 1906), or by agglutination tests with *B. dysenteriae* (Shiga). If the distinction is not made, amœbic cases unsuccessfully treated may be counted to the discredit of the bacillary serum, which, if the published results be true (see DYSENTERY), has remarkable potency.—[J. W. W. S.]

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URINARY SURGERY.—The literature of this year, bulky though it has proved, shows no startling departure from the routine and accepted surgical treatment of urinary disease, with the exception of one very important suggestion by F. S. Watson, of Boston. After an able analysis of 653 tumours of the bladder, he refers to the malignant activity of villous papilloma of the bladder, and proposes that a double nephrostomy should be performed and the entire bladder be extirpated as a last resource. Extirpation of the bladder, and implantation of the ureters into the bowel, is not novel, but a double nephrostomy and the wearing of a loin urinal is probably original.

From the consideration devoted this year to the ureter, it is evident that this canal and its diseases will soon receive that attention which their great importance merits. The removal of stone from its channel, and repair of irregularity in its calibre, are the principal lines along which progress is being made.—[E. H. F.]

ABDOMINAL SURGERY. (See also APPENDIX, DUODENUM, GALL-BLADDER, LIVER, PANCREAS, PERITONITIS, RETRO-PERITONEAL LIPOMATA, SPLEEN, STOMACH, URACHUS.)

A. W. Mayo Robson, D.Sc., F.R.C.S.

Overlapping of the Aponeuroses in the Closure of Abdominal Wounds, including Umbilical, Ventral, and Inguinal Hernia.—A paper by Charles P. Noble¹ confirms and amplifies the experience of others that, by

the employment of this method, post-operative hernia may as a rule be prevented. He concludes his article by stating :—

The best evidence which I can give as to the practical merit of the method in the prevention of post-operative hernia is the fact that during the nine years in which the method has been in use, but a single patient has presented herself with post-operative hernia. Others may have occurred of which I have no knowledge, but it is quite clear that post-operative hernia plays an unimportant rôle when the aponeuroses are overlapped in the closure of cœliotomy wounds.

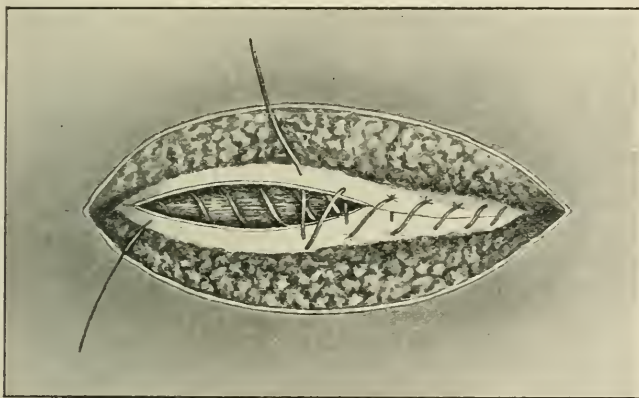


Fig. 2.—Closure of the wound in the aponeuroses of the oblique muscles. Overlapping the aponeuroses by superimposing that of the right side of the wound upon that of the left, and suturing with a continuous chromicized catgut suture.

Post-operative Ileus.—Among the serious complications which may follow a surgical operation involving the opening of the abdominal cavity, there is none, except secondary hæmorrhage, which more urgently demands an early diagnosis and prompt relief than intestinal obstruction. In isolated instances it has been observed after operations where the peritoneal cavity was unopened. Just at the time when the surgeon has begun to be relieved somewhat of his anxiety, and to congratulate himself that once more his labours have been crowned with success, it is most disheartening to patient and surgeon alike to be confronted with the added perils of a secondary operation. John M. T. Finney², of Baltimore, in an interesting paper, says that it has been his misfortune to meet with 26 cases of post-operative ileus in his hospital and private practice, 22 of which required secondary operation of one sort or another: and he is sure, although he has not complete records of these cases, that during this time he has seen an equal number in the practice of his colleagues in the Johns Hopkins Hospital and elsewhere.

The two great factors concerned in the etiology of post-operative ileus are of either mechanical or septic origin. There is still a third and much smaller class, in the development of which neither of these two forces is directly concerned, namely, those rare and interesting cases of adynamic ileus having their origin in disturbed conditions of the innervation and circulation of the intestine. We would therefore divide post-operative ileus into three main classes: (1) Mechanical, (2) Septic, (3) Adynamic. But a hard and fast distinction is difficult to maintain, owing to the fact that they may all be present in the same individual.

The diagnosis of obstruction is all important. Once this is established, the treatment is determined, since there is but one rational course to pursue. It is obvious that the earlier the diagnosis is made and the necessary relief accomplished, the better.

The cause of obstruction was kinking in 7 cases; adhesions alone, 7; bands, 3; volvulus, 2; loop caught beneath adherent loop, 1; cicatricial stenosis, 1; gastro-mesenteric ileus, 1; adynamic ileus, 1; cause unknown in 3. In 23 of the cases the cause of obstruction was definitely known. Of these, in 18, or 78 per cent, the obstruction occurred either directly or indirectly as the result of peritoneal adhesions. It will thus be seen that of all the factors concerned in the causation of intestinal obstruction, peritoneal adhesions exercise by far the greatest influence.

The seat of the obstruction was in the small intestine in 20 cases; within the lower twelve inches of the ileum, 10; exact position not stated, 10; pylorus or duodenum, 3; sigmoid, 2; ascending colon, 1.

Peritonitis, more or less general, was present at the time of the primary operation in 15 cases. At the time of the secondary operation it was found present in 8. It was the cause of death in 3 of the fatal cases. The treatment employed was freeing of the adhesions in 9 cases, enterostomy in 9, primary intestinal anastomosis in 2, exploratory laparotomy, nothing done, in 2; no operation in 4. Of the fatal cases, 4 died without relief from the obstruction, 3 from peritonitis, and 3 from symptoms suggesting toxæmia.

Pneumonia after Laparotomy.—The discussion at the German Surgical Congress, 1905, shows that lung complications are much more frequent in Germany than in this country. In my own experience, pneumonia after abdominal section is very seldom seen. I think this is due to avoiding unnecessary exposure on the operating-table; to the completion of all preparation of the patient, and of instruments, ligatures, etc., before the anæsthesia is begun; to the envelopment of the patient in a gamgee tissue suit before he comes into the operating-room; to careful preliminary oral asepsis; to the general use of chloroform instead of ether; to the sterilization of the anæsthetic apparatus before use; to the employment of dry aseptic towels around the patient and the use of dry swabs at the time of operation; to the strictest asepsis during operation; to the position of the patient after

operation in a semi-propped-up decubitus; and, not least, to care in keeping the room at the time of, and after operation, at a proper temperature.

REFERENCES.—¹*Ann. Surg.* Mar. 1906; ²*Ibid.* June, 1906.

ACCESSORY SINUSES. (See SINUSES, DISEASES OF.)

ACNE.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Joseph¹ strongly recommends a new preparation obtained by the condensation of tar with formaldehyde, and called **Pittylène**. It is a fine brownish yellow powder, soluble in acetone, alcohol, or collodion. It is made up as a soap, which must be rubbed into the face for five to ten minutes, and then left on all night. As in most soap treatments, in due time inflammatory reaction sets in, and soothing applications must be used. Out of 78 cases he claims 67 successes.

Moschouritz² has succeeded in adapting **Bier's Congestive Method** to acne by applying cupping glasses from 2 to 4 cms. wide to the pustules. The suction, which should be so slight that removal is easy, is produced by rubber bulbs attached to the glasses. A séance consists of applications each lasting one or two minutes only and spread over an hour, but several places may be simultaneously attacked. This laborious proceeding is repeated daily, and improvement generally follows in from two to five days. He reports success in 8 cases.

One of the most troublesome seats of acne is the chin; and referring to its occurrence there in women, Pautrier³ says the first essential is to attend to any uterine or sexual trouble, and goes so far as to state that "the patient should therefore be carefully examined and treated by a gynæcologist." Local measures must be energetic, as generally the skin is seborrhœic, thick, and little sensitive to irritants, any pustulation being previously treated with the galvano-cautery. The following ointment is applied at night:—

R	Sulphur	2'0	Resorcin	1'0
	Salicylic Acid	50	Vaselin	30'0

or what Brocq recommends:—

R	Camphor	5'0	Prepared Chalk	7'5
	Resorcin	5'0	Vaselin	20'0
	Sulphur	15'0	Soft Soap	7'5

The above is to be allowed to remain for five or ten minutes at a time, increasing the length of the application gradually, until it can be borne for thirty minutes. To relieve the inflammation he uses the following paste:—

R	Lanolin	Zinc. Oxid.	
	Pulv. Amyli	Hux-Sal	āā 10'0

Lastly, radiotherapy may be required in obstinate cases, applied for three or four minutes every fifteen days. With regard to this last method, Stelwagon⁴ has come to the conclusion that it is not of the

same curative value in all cases, and in some has but little influence unless pushed beyond the safety limit. In fact, although the results are often favourable, erythema has to be induced, and either atrophy of the skin or excessive growth of downy hair may be a sequel.

REFERENCES.—¹*Derm. Centr.* 1905, No. 3, p. 66; ²*Sem. Méd.* Jan. 24, 1906; ³*Internat. Ther.* Aug. 1906; ⁴*Jour. Cut. Dis.* Mar. 1906.

ACTINOMYCOSIS OF THE BREAST. *Priestley Leech, M.D., F.R.C.S.*

Poiteau, in a recent thesis¹, reviews all the cases recorded. Actinomycosis of the breast is generally a secondary infection, being preceded by a pleuro-pulmonary or cutaneo-thoracic lesion, and the breast affection may extend by contiguity or by a true metastasis. It is met with in patients between the ages of twenty-two and thirty-five years. There are three stages: (1) A tumour; (2) A peripheral inflammatory reaction arises round the tumour; (3) An ulcerative process appears. There is no pain at first, and on examination a very hard, well-defined mass, without adhesions or inflammatory reaction round it, will be seen, and the patient's general health is not affected. Then the skin reddens, softening appears at certain points, and the disease resembles sarcoma, but the growth is more limited. Suppuration, which is apt to be protracted, then occurs, ulceration often appearing in several spots at one time. There is no involvement of the axillary glands. The only possible confusion to which actinomycosis may give rise is with tuberculous disease of the breast. In tuberculous disease the axillary glands are usually involved. Search should be made for the actinomycotic grains in the pus.

TREATMENT.—**Potassium Iodide** in large doses, with **Arsenic**, should be tried. Injections of **Sodium Cacodylate** is also indicated. If medicinal treatment makes no impression on the disease, total and complete **Amputation** of the breast should be done.

REFERENCE.—¹*New York Med. Jour.* Aug. 18, 1906.

AKATAMA.

J. W. W. Stephens, M.D.

This is the native name for a form of endemic peripheral neuritis described by Wellman¹ in the hinterland of Angola. It is thought to be different from the neuritis of beri-beri, malaria, etc. It is characterized by swelling, hyperæmia, sensations of prickling, burning, numbness, and occasionally by marked sweating in the affected parts, generally the legs or arms. The distribution and nature of the disease are quite unknown.

REFERENCE.—¹*Arch. f. Schiffs u. Trop. Hyg.* Feb. 1906.

ALBUMINURIA (Functional). (*See also* DIABETES, ALBUMINURIA IN, and NEPHRITIS.) *Prof. J. Rose Bradford, D.Sc., M.D.*

Clement Dukes¹ considers that three types of functional albuminuria may be seen in school-boys. The first and largest class show increased arterial tension, which he attributes to irritability of the vasomotor

apparatus. This form of albuminuria Dukes records as most frequently produced by excesses of nitrogenous food and imperfect elimination, together with an hereditary tendency to gout. This class of case is most efficiently treated by some curtailment of the proteids in the food and the occasional administration of **Blue Pill**.

Another class of case comprises those who have cold, clammy, and congested extremities, accompanied by a large, feeble, compressible pulse, arising from deficient vasomotor control. In this class of case the heart participates in the general deficiency of tone, and dilates; and chilblains are also frequent. Dukes considers that these cases should be treated by abundance of food and the administration of tonics, such as strychnine and arsenic. In the third class of cases the patients are spare, highly strung, over-sensitive neurotics. The pulse in these cases is thin and thready, and the tension is variable. Dukes considers that the **Bromides** should be administered to this type of case, with occasional doses of **Blue Pill**.

Dukes considers that in all forms of functional albuminuria it is unnecessary to interfere either with the system of education or with the games that the boys are engaged in, and that it is generally inadvisable to curtail the food supply. Further, he urges that they should join in every description of exercise that does not involve competition for prizes, as through exercise the cardiovascular system becomes more stable. He found, that of the boys of the age of thirteen or fourteen, 16.27 per cent were affected with albuminuria, and further, that the incidence was a little different at different times of the year, inasmuch as in January and in May some 14 per cent were affected, as compared with between 17 and 18 per cent in September. He is further of opinion that the albuminuria tends to become more frequent towards the close of school life. The circulation in many of these cases is very unstable, and in addition to the chilblains and other vascular phenomena mentioned above, these cases are often liable to suffer from syncope and momentary loss of consciousness. Dukes is of the same opinion as other writers, that this form of albuminuria does not prove to be the precursor of organic disease of the kidneys.

Wright and Ross² have investigated a series of cases of physiological albuminuria with reference to the percentage of salts in the urine, and determining in this manner whether the renal functions are impaired or not, inasmuch as the efficiency of the kidney can be determined to a considerable extent by ascertaining whether it is able to elaborate a concentrated urine, or at least a urine in which the salts are concentrated. These observations show that in physiological albuminuria the renal functions are unimpaired, and contrast in a marked manner with what obtains in renal disease. The authors consider that physiological albuminuria must be due to the transudation of lymph into intact urinary tubules, and they determined that in some of the cases of physiological albuminuria there was diminished blood coagulability. Wright and Ross were therefore led to treat these cases by **Calcium Salts**, and they record six cases where the administration

of 60 gr. of calcium lactate was followed by the disappearance of the albuminuria. In some instances the albuminuria disappeared within an hour of the administration of the drug. The table of cases recorded does not give any details of the clinical course of the affection. Wright and Ross are further of opinion that the administration of calcium lactate may serve to distinguish a functional from an organic albuminuria, inasmuch as the albuminuria of renal disease is not affected by the administration of these lime salts.

Gobbi³ records some observations on the albuminuria and glycosuria occurring in athletes as the result of fatigue. He examined 8 out of 27 competitors in a 26-kilometre race: 4 were gymnasts and 4 were soldiers of an Alpine regiment. They were all in good health, and their urine was normal. After the race albumin and sugar were present in the urine in all 8 cases. In 2 cases the albumin was only present in traces, in 1 to the proportion of '25 per thousand, in 2 in the proportion of '5 per thousand, in another of 1 per thousand, and another of 2'5 per thousand. The urinary sediment in all cases contained leucocytes and in 4 instances red blood corpuscles were present. In 3 cases granular casts, in 1 hyaline casts, and in another epithelial casts were present. The quantity of sugar varied from '05 per cent to a maximum of '5 per cent. Eight days after the race the urine was again examined, and traces were found in 5 cases of sugar, and in 3 of albumin. The author concludes that no connection exists between the quantity of albumin and sugar eliminated by the same individual; in 2 cases where there was much albumin, and the specific gravity of the urine was low, the competitors were more exhausted than any of the others. These cases are of interest as showing the great frequency with which albuminuria occurs as a result of fatigue in the healthy, and they also draw attention to the occurrence of glycosuria from a similar cause.

Functional albuminuria is often attributed to the existence of a slight renal lesion produced by a former attack of some acute specific infection, and scarlet and typhoid fever have both been regarded as possible causes. Le Noir⁴ draws attention to the interesting fact that functional albuminuria may actually disappear during the occurrence of such an acute infection. A young girl suffering from functional albuminuria contracted scarlet fever, and during the whole time that she was kept in bed the albuminuria was absent, but reappeared as soon as the patient was up and about. Such cases show that the occurrence of scarlet fever in the history of a person suffering from functional albuminuria must not necessarily be regarded as a cause of the condition. Widal considers that the disappearance of albuminuria by rest in bed is dependent on the fact that the functional activity of the kidney is greater in the recumbent posture.

REFERENCES.—¹*Brit. Med. Jour.* Oct. 7, 1905; ²*Lancet*, Oct. 21, 1905; ³*Revista Crit. Clin. Med.* April, 1905; ⁴*Sem. Méd.* Feb. 14, 1906.

ALCOHOLISM AND INSANITY.*C. C. Easterbrook, M.D.*

STATISTICAL AND ETIOLOGICAL.—W. Bevan Lewis¹ states that in England and Wales agricultural communities are relatively to population the least intemperate and criminal, and the most poor and insane; and that mining and manufacturing communities—and maritime more so than inland—are relatively to population the most intemperate and criminal, and the least poor and insane. On the statistical map of England and Wales, therefore, intemperance is dissociated from insanity, intemperance and crime going together, whereas insanity is associated with pauperism and its attendant poverty, want, worry, anxiety and other "moral" factors.

W. C. Sullivan² distinguishes two types of intemperance or drinking: (1) Convivial drinking, which is responsible for much drunkenness but little alcoholic crime, disease, and mortality: (2) Industrial drinking, which is responsible for little drunkenness but much alcoholic crime, disease, and mortality. The latter is thus the more serious social and national evil. In agricultural districts there is the least drunkenness, a low rate of alcoholic crimes (homicidal and suicidal), and a low rate of mortality amongst agriculturists from alcoholic diseases. In manufacturing towns there is more drunkenness, a higher rate of alcoholic crimes, and amongst textile and metal workers a very high rate of mortality from alcoholic diseases. In seaports there is still more drunkenness, the highest rate of alcoholic crimes, and amongst dockers the highest rate of mortality from alcoholic diseases. In mining districts there is the most drunkenness of all, but the rate of alcoholic homicidal crime is much the same as in the manufacturing towns; the rate of alcoholic attempted suicide is even lower than in the agricultural districts, and amongst miners the rate of mortality from alcoholic diseases is the same as the low rate amongst agriculturists in agricultural districts.

As to the nature and origin of industrial drinking, it depends on two factors: (1) Primarily, the supposed action of alcohol as an aid to labour; this idea is based on the preliminary but evanescent stimulant effect of alcohol on the psychomotor and muscular apparatus; the main effect of alcohol, however, on the motor, as on the sensory mechanism, is depressant. (2) Secondly, the facility of access to alcohol during the hours of labour. Hence the miner, who is not allowed to take "liquor" into the mine, comes to learn that a "drink" before going below is not a good thing on which to do an eight or ten hours' shift of heavy work, and the miner therefore devotes himself to convivial rather than to industrial drinking. The docker, on the contrary, who can obtain drink at all hours during his work, by constant renewals never allows the initial stimulant effect of alcohol to be replaced during working hours by the after depressant effect, and consequently the alcoholic mortality amongst dockers is second only to that of workers in the liquor trade itself.

Parental Alcoholism.—Bevan Lewis (op. cit.) states that parental alcoholism tends to the evolution in the progeny of degenerate and

explosive types of criminality psychosis and neurosis, e.g., idiocy, imbecility, defectiveness, moral and impulsive psychoses, adolescent insanity, systematized delusional insanity, hysteria, chorea, and epilepsy. Paternal alcoholism is more apt to give rise to the explosive and motor types, e.g., epilepsy, whereas maternal alcoholism—in which there is probably alcoholic toxæmia of the ovum—is more apt to give rise to the developmental arrests, e.g., idiocy and imbecility.

PATHOLOGICAL.—F. W. Mott³ draws attention to the rarity of alcoholic liver in asylum as compared with hospital post-mortem work, and from his extensive experience at the London County Asylums can recall only one case of hob-nail liver with abundant ascites—the case of the notorious Jane Cakebread. This important fact will be fully endorsed by the experience of psychiatrists, many of whom, indeed, have noticed the rarity of alcoholic cirrhosis of the liver in those dying insane, but have not published comparative statistics on the point, as Mott now does. He found that definite alcoholic liver affection was ascertained at the post-mortem in 9·1 per cent men and 4·9 per cent women amongst 1099 Charing Cross Hospital cases (735 men and 364 women), as compared with only 2·2 per cent men and 1·4 per cent women amongst 1271 Claybury Asylum cases (627 men and 644 women): and that during life ascites had not been exhibited by the asylum patients presenting the liver lesions, whereas amongst the hospital cases two-thirds of the women and more than one-third of the men presenting the hepatic cirrhosis at the post-mortem had suffered from ascites. Mott rightly explains the rarity of alcoholic cirrhosis of the liver in the insane by the fact of their instability of nervous system—their *locus minoris resistentiæ*—in virtue of which, through alcoholic abuse the subject is driven into an asylum long before he can drink enough to produce a cirrhotic liver.

CLINICAL.—Alcoholic abuse may be a co-operative factor in the causation of any form of psychosis, and may similarly be a symptom of mental disorder and to some extent colour the symptoms. But in the diagnosis of alcoholic insanity proper there are characteristic physical and psychical symptoms which point to alcoholic poisoning as being the important factor and feature of the disease, although even in these cases, in view of Metchnikoff's observation that alcoholic abuse diminishes the number of phagocytes and so lowers the defences of the body against bacteria, it may be held that the specific signs of alcoholism are in part due to microbic toxæmia. Bevan Lewis has shown that impairment of muscular sense discrimination and retardation of reaction-time are amongst the earliest effects of alcoholism, and are marked features in alcoholic insanity, and that in early cases which end fatally the transition zone of cerebral cortex immediately behind and in front of the central gyri shows distinct cell degenerations, in many cases profound. The characteristic clinical symptoms of alcoholic insanity proper are typically seen in cases of alcoholic delirium tremens and alcoholic polyneuritis, the symptoms comprising delirium or confusion, with failure of memory—

especially for recent events—and loss of knowledge of time and space, plausibility, prevarication, fabrication and confabulation, emotionalism—usually of unhappy type—marked psycho-sensory disturbances in the form of vivid illusions and hallucinations, and often terrifying delusions associated therewith, marked psycho-motor restlessness, largely purposive and in response to the hallucinations and delusions, diminution of motor power and co-ordination, retardation of reaction-time, alterations of the deep reflexes, and marked disturbances of peripheral nervous function, sensory (e.g., hyperæsthesia, paræsthesia, or anæsthesia), and motor (e.g., tremor). Apart from alcoholic neuritis, gastric catarrh and dilatation, and in old-standing cases acne rosacea and alcoholic disorders of the liver, kidneys, arteries, and heart may be present, and form aids to diagnosis to be used with discrimination.

Quinquad's sign, which is said to occur in most chronic alcoholics, whether sane or insane, and to be pathognomonic of chronic alcoholism, and is not to be confounded with alcoholic tremor, is elicited by making the subject press steadily downwards with partially flexed and partially separated index, middle, and ring fingers of the hand in the prone position upon the supine and fully extended palm of the examiner; in a few seconds a sensation of crackling or crepitus is conveyed to the examiner's palm from the fingers of the subject if a toper.

In cases of mild alcoholic delirium without disorientation or obvious hallucinations, Reichardt⁴ states that if the patient be given a sheet of white paper and asked to describe what he sees thereon, he will describe many objects seen, and that this test for eliciting visual hallucinations is pathognomonic of alcoholic delirium. The alcoholic, and in the writer's experience especially the polyneuritic alcoholic, when being tested as to memory and knowledge of time and place, is characteristically ready with an answer, and if this is wrong, as is usually the case, just as readily tries to cover the mistake. The amnesic, disorientated, and deteriorated alcoholic is often characteristically anxious to give the impression that his mental faculty is intact.

For eliciting slight mental impairment which might be overlooked, as in alcoholics during convalescence, Mott (op. cit.) employs the following three tests, which involve simple exercises of the attention, memory, and judging and reasoning powers.

1. Name of person test, e.g., ask the patient to mention the name of some well-known person coming about him, say the doctor; probably the name is forgotten, so it is mentioned to the patient, and he is asked to remember it; then discuss some other subject or apply the other subjoined tests, and again in a few minutes ask the patient to repeat the name, which is possibly already forgotten or imperfectly remembered.

2. Simple arithmetical tests, e.g., ask the patient to repeat the multiplication table or to multiply one number by another, and then

to multiply the same numbers with multiplier and multiplicand reversed, or to state how much change there ought to be out of, say, 2s. 6d. after buying a pound of tea at 1s. 6d. and a pound of sugar at $2\frac{1}{2}$ d.

3. Marie's three order test in aphasia, e.g., give the patient three pieces of paper of unequal size, with a simple distinct order for each piece; the patient will be able to carry out each order when given separately, but will probably bungle matters if given the three at once.

Mott gives a good description of the types of hallucinations and illusions met with in alcoholic cases, and lays stress on the point that the persistence of such, while the mind otherwise becomes clear, indicates that the case is one in which alcohol has only played a subordinate part, and that the outlook of chronic insanity is probable.

DRUG TREATMENT OF INEBRIETY.—There is a tendency at present to draw somewhat artificial lines of distinction between the vice drunkenness, or ordinary alcoholic intoxication, and the disease alcoholism, which is the result of more or less prolonged alcoholic abuse and poisoning, and is manifested in the form of various special disorders of the nervous and other bodily organs. It has already been mentioned that alcoholic abuse may be a cause or a symptom of insanity, and may give rise to a definite, recognizable, toxic psychosis, alcoholic insanity proper. Distinct from this is another psychosis in which the real disease consists not in the effects produced by prolonged alcoholic poisoning (though these effects may be superimposed), but in a periodic intense craving for the mental state produced by alcohol (dipsomania) or narcotics and similar drugs (narcomania); and finally there is the psychosis in which all the foregoing more or less, if persisted in, tend in time to end a characteristic mental and moral deterioration, which for want of a better name may be termed a moral dementia. The term inebriety is limited by some to the last-mentioned psychoses, especially to the periodic forms. Inebriety must therefore be treated much on the lines of other periodic psychoses, but with special attention to the building up of self-control.

For this reason it is impossible to cure an inebriate against his will. It is in the first place necessary for him to make up his mind to become and to remain permanently teetotal as regards alcohol or narcotic drugs. There is probably no short cut by the temporary administration of other so-called specific drugs to the cure of inebriety, a psychosis usually of long standing; there is even a risk of teaching a patient other drug habits. At the same time some physicians hold that, in addition to enjoining absolute teetotalism, ordering a well-regulated life as regards meals, sleep, rest, occupation, exercise in the fresh air, and the like—this régime being carried out under proper supervision, and if necessary away from the patient's usual surroundings and temptations—and prescribing bitter tonics for the relief of the initial anorexia and sinking epigastric sensations, the hypodermic administration of atropine and strychnine for a few weeks produces some

molecular change in the cortex cerebri, in virtue of which there is at once created a loss of craving or even an actual repulsion for the mental state produced by the alcohol or drug in question, which is more or less lasting in character.

There are variations of opinion as to the most efficacious dosage. some recommending small doses during the whole period of treatment (e.g., liq. atropin. sulphat. 1 min. and liq. strychnin. hydrochlorat. 4 min. given hypodermically twice daily for a month, then once daily for a fortnight, and finally once every second day for another fortnight): others again recommend that the doses be gradually increased day by day until full physiological effects are observed, and then gradually decreased, during the first three or four weeks of treatment, at the end of which the atropine is stopped, the strychnine being continued in small doses for another three or four weeks. The atropine and strychnine treatment of dipsomania and narcomania is still on its trial, for it has not been accepted by the profession. As inebriety is a periodic psychosis which is sometimes ushered in by observable prodromal symptoms, more evidence is desirable as to the efficacy of the treatment in aborting threatened or incipient attacks.

REFERENCES.—¹*Jour. Ment. Sci.* April, 1906; ²*Ibid.* July, 1904. and July, 1906; ³*Ibid.* Oct. 1906; ⁴*Neurol. Centr.* June 16, 1906.

ALEPPO BUTTON. (*See LEISHMAN'S BODIES.*)

ALOPECIA AREATA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Hallopeau¹, a very strong upholder of the parasitic origin of this condition, states the grounds for his belief, and amongst these are: (1) The fact that it is observed to occur in groups—in families, schools, military barracks, etc. Even at the St. Louis Hospital doctors are frequently affected. On the other hand, in religious institutions, where heads are kept continually covered, it occurs very rarely; (2) Clinically it resembles a parasitic disease: (3) The areas are often multiple; (4) The negative results of inoculation may be explained on the theory that the organism lies deeply, and only reaches the surface at times of activity; (5) He avers that it is amenable to antiseptic treatment.

An interesting outbreak among policemen is detailed by Mayer². All were in perfect health, but the sleeping accommodation was so limited that often four or five slept by turns in the same bed. One man had an old-standing alopecia areata, and in time 11 out of 35 policemen became affected, and all on the posterior and lateral aspects of the head. This could be explained in no other way than by direct infection from the pillow. One cannot well understand Sabouraud's³ contention that these epidemics in schools are really false. He maintains that the scars of blows, burns, boils, and abscesses are commonly mistaken for alopecia areata, and that cured impetigo contagiosa with the crusts removed simulates an epidemic of this disease.

Hallopeau admits that a nervous type undoubtedly exists, but its characteristics are distinct, and probably Wende's⁴ case given below would come under this category. A healthy girl with abundant hair was suddenly seized with violent headaches, and a week later all the hair of the head, eyelashes, and eyebrows fell out, while the nails also atrophied. Six years later the condition persisted.

Nicolas Favre⁵ reports the cure of a case which had lasted five years, by means of compression with an elastic bandage. The pressure was applied just short of pain, and the interesting fact is mentioned that the hair did not grow on parts inferior to the band.

No other new treatment has been suggested, but we personally have seen several satisfactory results by exposure to the ordinary arc **Electric Light**.

REFERENCES.—¹*Jour. Mal. Cut. et de Syph.* May, 1906; ²*Derm. Zeit.* 1906, p. 59; ³*La Clin.* No. 9, 1906; ⁴*Jour. Cut. Dis.* 1905, p. 517; ⁵*Lyon. Méd.* Dec. 31, 1905.

AMPUTATIONS.

Priestley Leech, M.D., F.R.C.S.

Interscapulo-thoracic Amputation.—Rutherford Morison¹ reports three cases. One was in a girl aged eighteen years for a chondrifying sarcoma of the upper head of the humerus, with good recovery. The second case was in a man sixty-two years of age for epitheliomatous recurrence in the axilla and upper arm; he recovered from the operation, but died fifteen weeks later of exhaustion following recurrence. The third case was in a young man aged twenty-four, for periosteal sarcoma of the round-celled type on the left shoulder; recovery was uneventful, but the patient died eleven weeks later from secondary growths in the lung. The subclavian artery was tied early, and shock was practically avoided by the injection of the nerve trunks with a 4 per cent solution of cocaine, as recommended by Crile (*vide Med. Annual*, 1906, p. 451).

Bier's Osteoplastic Amputation.—Hogarth Pringle², of Glasgow, says the results of this method are admirable. A patient with an osteoplastic amputation of the leg or femur can put his whole weight on the face of the stump just as well as another patient can bear his weight on a Syme's stump. In the upper limb the advantages of this method are that a working man will be able to bear pressure against his stump, as in pushing against objects. In a few cases the bone flap does not unite, but Pringle thinks that it should be the operation of choice in all cases where there is a reasonable prospect of avoiding virulent suppuration. Bier advises that it should not be employed in diabetes and senile gangrene, but he says that he has not found that a moderate suppuration endangers the vitality of the bone flap.

The technique in an amputation through the middle of the leg is as follows: A flap of skin and subcutaneous tissue is cut, preferably from the antero-internal aspect of the limb, and reflected with care so that no damage is done to the periosteum covering the skin surface of the tibia. Then three sides of a rectangular flap of periosteum are

cut on the skin surface of the tibia, the two lateral incisions being made just beyond the margins of this surface of the bone, and the transverse incision about one and a half inches down from the base of the skin flap. The periosteum is raised for about one-third of an inch upwards from the transverse incision, and then a fine saw is applied, and a thin flap of bone, still adherent to the periosteum, is cut from the compact bone of the shin surface. If it consists of the whole thickness of the compact layer of bone it does not matter. Its length must be equal to the transverse diameter of the tibia, but it may be made long enough to cover the transverse surfaces of the tibia and fibula as well. When this flap of bone is cut sufficiently long, its base is snapped through, but the periosteal bridge connecting it to the bone of the stump must be carefully preserved. The bone flap being held out of the way, a short posterior flap is cut, and the bones of the leg are cleared and divided transversely. The prominence of the sharp shin border is removed, and after the vessels are tied, the bone flap is sutured by the margin of the periosteal covering to the edge of the periosteum of the bone of the stump, and to the muscles of the stump as well, so that it comes down close over the sawn end of the tibia. The patient is encouraged to bear weight on the end of the stump as soon as the wound is healed, and at the end of four weeks a wooden pin leg can be fixed to the stump by plaster of Paris bandages, and the patient can get up.

Griffith-Stokes Amputation.—Corson³ finds from radiographic examination that there is as a rule no osseous union between the patella and the end of the femur. The patella in his case was pulled somewhat upwards, and efforts to obtain bony union need not be persevered in. The retention of the patella in the anterior flap is desirable, as it gives a much better stump.

Thigh.—H. B. Gessner⁴ reports two cases of amputation of the thigh where he injected **Cocaine** into the great sciatic nerve and the internal saphenous before division, after the flaps were partly cut. There was no shock. [This method appears to the Editor, from his personal experience in one case, to be well worthy of a trial. In an old woman seventy-two years of age, cocaine solution was injected into the sciatic and anterior crural nerves through the skin, and there was no shock either during the operation (which was done under a general anæsthetic) or afterwards.]

REFERENCES.—¹*Brit. Med. Jour.* Nov. 25, 1905; ²*Lancet*, Nov. 18, 1905, p. 1465, also Bier in *Arch. f. klin. Chir.* Vols. xlv. and l., *Centr. f. Chir.* 1897, and Bunge in *Deut. med. Woch.* 1899; ³*Ann. Surg.* May, 1906; ⁴*Med. Rec.* July 28, 1906, quoted from *Amer. Jour. Surg.*

ANÆSTHESIA (Local). (See also SPINAL SURGERY.)

Priestley Leech, M.D., F.R.C.S.

The search for a local anæsthetic which shall be harmless and at the same time efficient goes merrily on, and one exclaims "Eureka" until another observer records an experience which demonstrates that the last discovered drug is quite as toxic as, if not more so than,

the older ones. **Stovaine** seems to be most in favour at present, and several papers have appeared on its use in local anæsthesia.

Marchetti¹ gives brief records of its use in 47 cases; he uses 3 cc. of a $\frac{1}{2}$ per cent solution; no ill effects were observed, and he thinks it less poisonous than cocaine.

Christie² gives notes on 63 consecutive cases where stovaine was employed in the throat and nose department of the Glasgow Western Infirmary. The solution was usually rubbed lightly into the surface. Sometimes the patient was operated on immediately, but usually he had to wait some time, and then swabs dipped in the solution were left in contact. A 20 per cent solution was used. Adrenalin did not appear to enhance the anæsthetic power. The electro-cautery and snare were used, and very few complained of pain. He concludes that stovaine is quite as powerful an anæsthetic as cocaine when swabbed on the mucous membrane of the upper air passages. Its effect is more rapidly produced and more rapidly passes off than that of cocaine: it is much less toxic, and its use is not attended by any more hæmorrhage than is that of cocaine. A disagreeable odour is emitted by the breath after its use.

McKenzie³ comes to similar conclusions, but says stovaine produces ischaemia of erectile tissues, and if left in contact with mucous surfaces for more than fifteen minutes may produce sloughing.

Lennander¹, of Upsala, has made some observations on the sensibility of the various parts of the body. He operates wherever possible by regional intraneural or perineural **Injections of Cocaine** solution (1-400 and 1-200) and adrenalin. He performs nearly all his hernias with local cocaine anæsthesia; the laparatomies with local anæsthesia, or local anæsthesia combined with ether intoxication, until the abdomen is opened, and then the ether is not given until the flat swab or sponges are withdrawn and the incision is sewn up. The article is worth reading, but is too long to abstract.

H. Braun⁵ reviews some of the newer local anæsthetics. He thinks **Novocaine** with suprarenin is markedly less toxic than cocaine, and quite as effective: its action is less durable when used without the suprarenin; he employed solutions of 0·25, 0·5, and 1 and 2 per cent, which can be sterilized by boiling.

Blondeau⁶ uses 2 cc. of 1 per cent solution of stovaine, with 4 drops of the 1 per mille adrenalin solution.

From a *Thèse de Paris* of recent date, several prescriptions are given for local anæsthesia in the same journal (Lucas-Championnière's), some of which are here reproduced :—

R Stovain. grs. viiss-xij | Aq. dest. ʒiiss

To be sterilized in an autoclave, and sealed up in bulbs for eye surgery :—

(a) R Stovain. gr. xv | Sol. Sod. Chlorid. (7⁰/₁₀₀) ʒiiss
Sterilize and preserve in bulbs for injections.

(b) R Stovain. ʒj | Sol. Sod. Chlorid. (7%_{aa}) ʒiiiss
Sterilize for instillations.

For carious teeth :—

R Phenol. Crystal.	Stovain.	ãã gr. xv
Menthol.		

Moisten a pellet of cotton-wool with this, and place in the cavity.

For piles and anal fissures :—

R Stovain.	gr. iv	Lanolin.	
Sol. Adrenalin (1% ₁₀₀)	ʒss	Vaseline.	ãã ʒiss

For cracked nipples :—

R Stovain.	gr. iv	Lanolin.	ʒv
Balsam. Peruv.	gr. xv		

For piles (a suppository) :—

R Stovain.	gr. $\frac{1}{3}$	Ol. Theobrom.	
Ext. Bellad.	gr. ss	q.s. for one suppository.	

For a spray in throat affections :—

R Stovain.	gr. iss	Alcohol (45°)	ʒiij
Menthol.	gr. iv		

For dentition :—

R Stovain.	gr. iss	Syrup.	ʒiij
Tinct. Croci	℥x		

To be rubbed on the gums several times in the day.

Lloyd Smith and Taylor Hughes⁷ recommend the use of a solution of '3 per cent cocaine hydrochloride in sodium sulphate, with distilled liquor hamamelidis, serum albumin, and suprarenal gland solution. Sixty minims of this mixed solution only contain half a grain of cocaine, and with 40 minims four or five teeth can be extracted without pain. Messrs. Oppenheimer & Son make the solutions.

REFERENCES.—¹*Gaz. deg. Osped.* Nov. 26, 1905, quoted *Brit. Med. Jour.* Epit. Mar. 17, 1906; ²*Glasg. Med. Jour.* Feb. 1906, p. 119; ³*Brit. Med. Jour.* May 12, 1906; ⁴*Gaz. d. Hôp.* April 3 and April 5, 1906; ⁵*Deut. med. Woch.* Oct. 19, 1905, quoted *Brit. Med. Jour.* Epit. Jan. 20, 1906; ⁶*Jour. de Med. et de Chir.* Aug. 25, 1905; ⁷*Pract.* Feb. 1906.

ANÆSTHETICS.

J. Blumfeld, M.D.

Leaving the more general questions, such as after-effects, shock, and preparation of patients, for later consideration, this *résumé* may well begin by briefly depicting the year's literature as it relates to the individual anæsthetics.

CHLOROFORM.—Beginning, therefore, with chloroform as the most important, we must first draw attention to the continued work of the Special Chloroform Committee of the British Medical Association¹. The recent work of this body is of a practical nature. It has dealt with the effects of known doses of the drug upon cardiac and skeletal muscle. Attempts have been made also to determine the percentage of chloroform which induces anæsthesia when inhaled into the lungs, and further, how much of this is retained in the blood, and how much escapes again with the expirations. Prof. Brodie's report upon the rate of absorption of chloroform during the induction of anæsthesia

has a most direct practical importance. The especial danger of the early stages of chloroform inhalation has long been clinically acknowledged; here we have its scientific explanation in that the rate of absorption is known to be higher during the second minute of inhalation than at any subsequent period. Corresponding to this, the volume of chloroform in the expired air is, during this period, less than at any other. The rate of absorption of chloroform is found to correspond roughly with the degree of lung ventilation, a result agreeing with that found by Tissot in a recent research². This observer finds that an equilibrium is never reached between the tension of a 9-10 per cent chloroform vapour and the amount carried by the blood, death happening before such an equilibrium can be reached. Tissot believes that the danger of the early stage is explained by the all-important influence of lung ventilation. Thus, during the "forced rapid breathing and that which is apt to occur in the stage of excitement, a dosage becomes dangerous which with normal respiration barely suffices to anæsthetize." Professor Brodie's experiments also show that absorption of chloroform generally rises and falls *pari passu* with rise and fall of lung ventilation.

Vernon Harcourt³ has made experiments which go to show that, speaking roughly, one-third of the amount of chloroform administered is retained by the patient. This observer points out the importance of the "dead space" in respiration, and the extent to which it is increased whenever a mask is used during the administration of anæsthetics.

The Committee's report also contains an account of work by Sherrington and Sowton bearing on the effect of chloroform in conjunction with carbon dioxide. Here again clinical experience, which so strongly deprecates the presence of cyanosis during the inhalation of chloroform, is borne out by the results of laboratory work.

From a practical point of view Chapin's⁴ investigation of the percentage of chloroform emitted from Junker's inhaler deserves note. Still more valuable is a similar research by Dr. A. G. Levy which bears upon the vapour derived from a Skinner's mask and drop bottle, probably the commonest method of chloroform administration throughout this country. Levy's article⁵ should be carefully studied by every practical anæsthetist. He shows the effect of using differing materials for the mask and of having different sized areas wet with chloroform. His investigation is in line with that of Legge Symes⁶ which we have referred to in a former year.

With regard to the intimate effects of chloroform upon the tissues of the body, the reader is referred to the work of Moore and Roaf⁷, and to the writings of H. G. Wells and others^{8 and 9}. Investigations into the effect of the drug upon renal activity may also be studied¹⁰.

ETHER.—The question of the extent to which anæsthetic drugs in the course of their elimination from the body may injuriously affect the renal cells has been at different times investigated, and Prof. W. H. Thompson¹¹ has recently made some researches in this direction.

He deals with the effects of prolonged narcosis from chloroform and ether upon renal activity, detailing results as regards concentration of urine and excretion of nitrogen, of water, and of chlorides. Roughly speaking, it may be said that there is diminished renal activity during narcosis, and after a few hours an increased flow of urine.

The rectal injection of ether vapour has once more been given a trial, and forms the subject of an article by Krugiline¹², who records 43 cases. Although the advantages to be expected from this method in the way of immunity from respiratory-passage injury are obvious, yet the disadvantages are equally apparent and more certain, and rectal administration is never likely to be of wide use.

The lung trouble that may occasionally follow the use of ether is well exemplified by a case recounted at length by Victor Pedersen¹³. To avoid such difficulties strict care must be taken to select a suitable anæsthetic for each case. The routine administration of ether to all and sundry must sooner or later meet with pulmonary or bronchitic after-effects. Pedersen appends to his article a useful list of such cases. E. E. Armstrong¹⁴, of Montreal, has also written recently upon this matter, drawing conclusions from 2,500 cases of ether anæsthesia.

ETHYL CHLORIDE.—The attractions of ethyl chloride are well displayed by J. H. Chaldecott's¹⁵ article, though his remarks on its safety in adenoid cases are a little discounted by fatalities that have recently occurred during this particular operation under ethyl chloride. The fact is that here, as in all cases of anæsthetic troubles, the factor of first importance is the administrator's experience and skill. Hitherto the necessity for such qualifications when ethyl chloride is used have not been properly recognized, an oversight that should not occur in future if the existence of written warnings on the point are of any avail¹⁶. It is at least a noteworthy fact that a large proportion of recently contributed articles on the subject of ethyl chloride deal with fatal cases.

A little experimental work upon this drug is recorded during the past year¹⁷. Thus, a research was undertaken to determine its effect upon the respiration, the heart, and the blood-pressure. The conclusions arrived at go to show that ethyl chloride has an effect on the heart through the vagus, and probably a depressant action on the heart muscle similar to that of chloroform: a lowering of blood-pressure was found. As an anæsthetic for infants, ethyl chloride is largely used, and a good account of it in this respect is given by Miss Flora Murray¹⁸. She employs a freer admixture of air than is generally permissible with adult patients. An analysis of 400 cases of anæsthetizations by ethyl chloride and by somnoform may be found in the *Lancet* of October 21, 1905; the patients in these cases were all subjected to dental operations. As regards the purity of ethyl chloride the *Lancet*¹⁹ give the result of an investigation into seven brands obtainable in London; five were pure.

In addition to Seelig's article²⁰ referred to in the General Review, the

question of *scopolamine-morphine narcosis* may be studied in the *Medical Record* for April 7th, 1906. The dangers of this method are epitomized by H. T. Whitacre²¹, who does not recommend its adoption. At the same time it must be admitted that, given the right kind of subject, very satisfactory results are to be obtained; a large element of uncertainty, however, is a serious obstacle to the use of this means of obtaining anæsthesia. Viron and Morel²² condemn the use of this combination of drugs as dangerous. They report twenty-five deaths and many non-fatal accidents in 2,000 cases. They declare the death-rate to be higher than that of chloroform.

The opinion of several American authorities upon the selection of anæsthetics and their reasons for the preferences stated may be read in the *Therapeutic Gazette* for July, 1906. A definite set of questions was formulated, and the various answers are contributed to this journal. None of the contributors refer to the use of "gas and ether" followed by chloroform, which is in London a common practice. On the other hand, the drop method of using ether seems in much greater favour in America than in this country.

The occurrence of hiccough during the inhalation of anæsthetics is a phenomenon which in a small degree is often observed. A curious case is related in which this respiratory derangement was maintained over a long period on two occasions after the inhalation of chloroform.²³ (See also SPINE, SURGERY OF, and EYE, GENERAL THERAPEUTICS OF.)

REFERENCES.—¹*Brit. Med. Jour.* July 14, 1906; ²*Comptes Rend.* Mar. 1905; ³*Brit. Med. Jour.* July 14, 1906; ⁴*Lancet*, Mar. 17, 1906; ⁵*Brit. Med. Jour.* Aug. 4, 1906; ⁶*Lancet*, July, 1904; ⁷*Ibid.* Mar. 31, 1906; ⁸*Jour. Amer. Med. Assoc.* Feb. 8, 1906; ⁹M. A. Z. Gianasso, *Sem. Méd.* June 3, 1906; ¹⁰Prof. W. H. Thompson, *Brit. Med. Jour.* Mar. 17, 1906; ¹¹*Brit. Med. Jour.* Mar. 24, 1906; ¹²*Der Frauenarzt*, Dec. 12, 1905, in *Med. Rec.* Mar. 24, 1906; ¹³*Ann. Surg.* Jan. 1906; ¹⁴*Brit. Med. Jour.* Mar. 19, 1906; ¹⁵*Clin. Jour.* Aug. 1, 1906; ¹⁶*Brit. Med. Jour.* Dec. 9, 1905, Mar. 10, 17 and 24, 1906; ¹⁷Large and Brown, *Laryng.* Nov. 1905; ¹⁸*Lancet*, Nov. 5, 1906; ¹⁹*Ibid.* Dec. 2, 1905; ²⁰*Glas. Med. Jour.* April, 1906; ²¹*Med. Rec.* Jan. 13, 1906; ²²*Progrès Méd.* Feb. 17, 1906, see also *Lancet*, Feb. 10, 1906, and *Amer. Med.* Nov. 11, 1905; ²³*Lancet*, Dec. 2, 1905.

ANEURYSM.

Alfred H. Carter, M.D., F.R.C.P.

Prof. Osler¹ found 16 cases of abdominal aneurysm occurring among about 18,000 admissions into his hospital wards. Fourteen occurred in males, and 9 (56 per cent) were under forty years of age. He regards syphilis as the all-important cause under forty years of age. In 12 cases the aneurysm was saccular, in 3 of which rupture occurred; and 1 was of the dissecting variety. In 2 cases there were no symptoms during life. With regard to symptoms, the earliest and most prominent feature throughout was pain of a dull boring type, varied in some cases with severe paroxysmal pains. The pain may simulate that of gall-stones, renal colic, or appendicitis, and may radiate into the testicles, or the anterior crural or sciatic nerves. Pressure usually gives slight relief. Nausea and vomiting were early

and severe symptoms in two cases : but apart from pain, and features associated with rupture of the sac, there were few symptoms.

As to diagnosis, he asserts that no pulsation, however forcible ; no thrill, however intense ; no bruit, however loud—singly or together—would justify the diagnosis of abdominal aneurysm, but only the presence of a palpable expansile tumour. The chief sources of confusion are neurotic pulsation, pulsation transmitted from tumours, pulsation in extreme anæmia, and pulsation associated with regurgitant aortic disease. Special difficulty may arise as the result of gradual leakage behind the peritoneum, forming a large tumour in the upper abdomen or flank, with little or no pulsation.

Little can be expected from treatment, but the author has seen two cases of spontaneous recovery. His experience of operative procedures has been almost uniformly unsatisfactory.

REFERENCE.—¹*Lancet*, Oct. 14, 1905.

ANEURYSM (Surgical Treatment of). *Priestley Leech, M.D., F.R.C.S.*

Frisch¹, on the basis of 19 personal cases, recommends **Radical Operation** with extirpation of the sac. If there is inflammation, with adhesion of the wall to surrounding tissues, part of the wall may be left without danger of necrosis, and it is wise to spare the neighbouring vein or nerves in this way. Free the sac as far as possible from its surroundings, incise it freely, empty it of clotted blood, and examine the inner wall for communication with the vein or another artery (this is especially important in the femoral artery below the origin of the profunda, as often severe hæmorrhage will follow from a branch entering the aneurysm from this vessel). After the sac is emptied, the vessel is tied above and below.

Halsted², of Baltimore, reports some experiments in dogs on the **Partial Occlusion of Blood-vessels**, especially of the abdominal aorta. Metal bands of silver and aluminium were employed to partially occlude the artery. Thrombosis was not observed in a single case. Applied tightly enough to completely interrupt the circulation, the band has caused atrophy and sometimes complete absorption of the aortic wall ; in such cases hæmorrhage has invariably been prevented by the formation of connective tissue. With one or two exceptions there has been no evidence of adhesion of the folded intima *under the band*. The aortic walls were folded so snugly on themselves that, the band being still in place, water could not be forced through with a syringe, and the walls could easily be smoothed out and the full lumen re-established on removal of the band. Less snugly, loosely and very loosely applied bands may remain on the aorta, femorals, and carotids, for months, without causing macroscopic injury to the walls of the artery. A band was applied to the left common carotid artery in a woman, without any drawback. The author thinks there may be a place in surgery for the partially occluding band.

Morrison³ applied Macewen's method—multiple scratchings of the internal wall—to a case of aneurysm of the ascending arch of the aorta.

The patient, a man of thirty-eight, was benefited. The pulsation was diminished, and the walls of the aneurysm became thicker.

Harvey Cushing⁴ successfully dissected out an arteriovenous aneurysm of the occipital vessels. Such an aneurysm is somewhat rare.

Luigi Bobbio⁵ reports a case of extracranial aneurysm of the internal carotid. The patient, a peasant twenty years old, had received a blow with a thin, sharp knife on the left cheek, a centimetre below the inferior border of the malar bone, and a centimetre behind a vertical line drawn from the external angle of the orbit. He had a large cervicofacial hæmatoma, with subconjunctival and subpalpebral ecchymosis, a hoarse voice (almost aphonic), and dyspnœa of moderate degree. There was paralysis of the muscles, extruding the tongue to the left. The hæmatoma also affected the palatine arches and the posterior part of the oral and laryngeal pharynx. There was complete paralysis of left vocal cord (cadaveric position), and difficulty in deglutition. Pulsation was found later, and the common carotid of the same side was tied. Later the pulsation ceased, and the patient was cured, except for the nervous damage to the recurrent laryngeal nerve and the hypoglossal. The diagnosis was false aneurysm of the internal carotid.

A study of the literature of the subject shows 13 cases of aneurysm of this vessel; 2 only were false aneurysms of traumatic origin; 3 were false aneurysms from an inflammatory origin; the remaining 8 were considered to have arisen spontaneously. An important symptom for diagnosis is a comparison of the pulse of the two temporal arteries. In aneurysm of the internal carotid the pulse is the same on both sides; in aneurysm of the external carotid there is a difference in time and in the dilatation of the two temporals. When an aneurysm of the internal carotid is sufficiently large to press on the external carotid, the pulses of the two temporals may be different. As regards treatment, **Ligature of the Common Carotid** is advisable, and in certain cases **Excision of the Sac**. In such cases the operation is often very difficult, and tracheotomy and temporary resection of the jaw may be necessary.

Mydegger⁶ records a successful case of extra-peritoneal ligature of the external iliac artery for aneurysm. Considerable difficulty was experienced in exposing the vessel.

Subclavian Aneurysm:—Savaneaud⁷ divides these aneurysms into two groups, viz., those which are extra-scalenic and those which are extra- and intra-scalenic. Those of the first group are essentially suitable for surgical treatment; they may be **Extirpated** or **Ligated**, the ligature being placed as near the aneurysm as possible according to Anel's method. In some cases it may be practicable to apply the ligature and then extirpate the tumour. In the second group the method of Anel is the more dangerous the nearer the ligature is applied to the heart. In such cases Brasdor's method is better. The immediate mortality of this is nil, and the remote effects are often very good. Medical and dietetic treatment are useless. **Subcutaneous Injections**

of **Gelatin** have given some cures in a 2 per cent solution, and may be recommended for those cases where an operation is too severe.

REFERENCES.—¹*Arch. f. klin. Chir.* xxix. No. 2, quoted in *Ther. Gaz.* June 15, 1906, see also *Münch. med. Woch.* May 15, 1906; ²*Johns Hop. Hosp. Bull.* Oct. 1905; ³*Brit. Med. Jour.* Mar. 10, 1906; ⁴*New York Med. Jour.* Dec. 23, 1906; ⁵*Il Policl.* Vol. xiii c, Feb. 1906, p. 49; ⁶*Ann. Surg.*; ⁷*Rev. de Chir.* July, 1906.

ANGIOFIBROMA CUTIS CIRCUMSCRIPTUM CONTAGIOSUM.

J. W. W. Stephens, M.D.

This is a new, markedly contagious dermatosis, first recognized in Santa Victoria de Palma, in the extreme south of Brazil, by Bassewitz¹. The eruption is quite sudden in its onset, consisting of bright red papules, most of which develop into larger tumours. They may occur all over the body, but the chief sites are the face, neck, axillæ, and pubic regions. The mucous membrane of the mouth is the most commonly affected of the mucosæ. The growths are dark red and shiny. Slight unavoidable injuries may give rise to frequent and profuse hæmorrhages, leading to severe anæmia. Such tumours may further ulcerate, becoming peculiarly offensive. Infection is probably by the mouth, the habit of passing round from person to person the pipes used in drinking "maté" giving plenty of opportunity for this. The whole course of the disease is afebrile; there is also an absence of pain and pruritus. There is no enlargement of the liver or spleen, nor any primary enlargement of the glands. The affection may last as long as a year.

DIAGNOSIS.—There is a complete absence of the febrile pseudo-rheumatoid stage observed in yaws and verruga peruviana. Yaws is characterized by the mulberry-like fissured tumours; from verruga peruviana the diagnosis is made by the absence of the following features: Lymphadenitis, enlargement of the spleen and liver, profuse sweating, fever, pruritus, hæmorrhages from the stomach and gut, urethra, endometrium, etc.; and also by the high mortality of verruga peruviana (12 to 95 per cent).

The PROGNOSIS is favourable, no death having been observed.

PATHOLOGY.—The tumours consist of fibrous tissue, traversed by enormous lymph spaces and blood-vessels. The first stage is a proliferation of the vessels of the cutis, the tumours in fact constituting an angiofibroma.

TREATMENT.—This comprises surgical and medical procedure. Owing to the danger of bleeding from injury, and the readiness of auto-inoculation of the tumours, complete **Removal** is often necessary, or the tumours may be injected with 40 per cent **Formaldehyde** or painted with a 5 per cent solution of **Paraform Collodion**. For ulcerated tumours the author recommends:—

R	Acid. Salicyl.	2·5 grams		Bismuth. Sub-salicyl. ãã 10·0 grams
	Zinc. Oxyd.			Talc. Venet. 27·5 gr.
				M. f. pulv. subtil.

Bennecke², who has submitted these tumours to a fresh examination, comes to the conclusion that they are really granulomata, and proposes

the name granuloma teleangiectodes tropicum (Bassewitz). They are therefore allied to granuloma teleangiectodes peruvianum and granuloma teleangiectodes europæum, the so-called human botryomykosis.

REFERENCES.—¹*Arch. f. Schiffs u. Trop. Hyg.* April, 1906; ²*Ibid.* May, 1906.

ANGIONEUROTIC ŒDEMA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

This term is often applied to conditions some of which might well be classed as erythemas. Its etiology is still obscure, but a toxæmia in a subject with a neurotic diathesis generally describes the present opinion. Lemaire¹ says the toxins may be digestive or specific, e.g., rheumatism, and produce the disease in patients of a neuro-arthritic temperament. He gives an account of an acute attack in a man of twenty-nine who had symptoms of gastric and hepatic catarrh. One day he suddenly felt an acute pain in the right shoulder. This disappeared in a few hours, and was succeeded a few days later by pain in the knee. Twelve days afterwards, on awaking, he could not open his left eye, and this on examination was found to be due to the presence of a firm, painless œdema of the eyelids. There was no redness or suggestion of urticaria. He was ordered 2 grams of **Aspirin**, and when this was increased to 3 grams next day, the swelling disappeared. A similar attack on the fifth day was traced to exposure to a cold wind, the lips and nose being the parts affected, but the condition disappeared during the course of the day. The urine was quite normal, and never during these attacks and another was there any itching or petechiæ.

Louman² mentions two cases, the first in a woman aged thirty-five, who got a severe fright and suffered from night-starts and screams for two weeks. Here also the eyelids were involved, but there were no signs of renal complication or traumatism. **Potassium Bromide** gave relief, but the swelling recurred. The second case, in a man aged fifty-five, of very nervous type, resisted treatment by bromide, arsenic, ergot, etc. Here again there was no evident constitutional trouble, but attacks affecting other parts of the body, but chiefly the face, followed any extra worry.

Forster³ found **Ichthyol** in 3-gr. doses thrice daily for two months produce a cure in the case of a nervous woman of thirty-five, where previously attacks occurred once a fortnight.

REFERENCES.—¹*L'Echo Méd. du Nord*, May 27, 1906; ²*Brit. Med. Jour.* April 14, 1906; ³*Ibid.* April 28, 1906.

C. C. Easterbrook, M.D.

Theo. Diller¹ reports two interesting cases of angioneurotic œdema occurring in neuropathic women. One patient, a married woman of fifty-one, had been the subject successively of attacks of (1) Spasmodic asthma, beginning with "cold in the head," from the age of thirty-two to the age of forty-four; (2) Spasmodic headache, from the age of

forty-four onwards; and (3) Angioneurotic œdema, from the age of forty-eight onwards; the attacks of œdema alternating with the headaches, affecting various localized areas of the body, coming on in the evening and usually lasting three or four hours. The other patient, a woman of twenty-six, who had been neurasthenic since puberty, became subject at twenty-five to attacks of acute circumscribed œdema affecting various parts of the body, but especially the hands, and lasting usually a quarter of an hour. After these attacks had continued for eight months, and while she was in a condition of considerable nervous exhaustion, she married, and a month later the attacks of œdema became associated with attacks of vivid hallucinations of sight and hearing, with accompanying feelings of terror. These came on towards dusk, and continued, along with the attacks of œdema, for six months, when both ceased much about the same time, after systematic anti-neurasthenic treatment had been in operation for a month.

REFERENCE.—¹*New York Med. Jour.* Mar. 3, 1906.

ANKYLOSTOMIASIS.

J. W. W. Stephens, M.D.

L. P. Phillips¹ describes the following mode of treatment, as thymol not infrequently fails: 6 p.m. a saline purge, no food during the night: 7 a.m., half, and at 7.30 a.m. the second half, of the following mixture:—

R	Eucalyptus Oil	2.5 grams	Castor Oil	40.0 grams
	Chloroform	3.5 grams		

Rest in bed until a motion results. A second treatment is sometimes necessary. In about half the cases the treatment was entirely successful.

The worms are said to develop best, according to Löbker and Bruno², in fæces diluted forty times. Treatment consists in administration of extract of **Male Fern** and **Castor Oil**. Instead of castor oil, **Calomel** or infusion of **Senna** may be used, and instead of male fern, **Thymol**.

In Porto Rico³, in 99 per cent of cases, "mazamorra," or ground itch, is the precursor of the disease, the larvæ thus gaining entry through the skin. **Thymol** and **Beta-naphthol** were the drugs relied upon.

REFERENCES.—¹*Lancet*, p. 285, 1906; ²*Arbeit. a. d. Kaiserl. Gesundheits.* No. xiii; ³*Brit. Med. Jour.* Aug. 1905.

ANTRUM (Suppuration of). (See SINUSES, DISEASES OF.)

ANUS. (See also RECTUM).

P. Lockhart Mummery, F.R.C.S.

Fissure in Ano.—Pennington¹, in an interesting paper on the etiology of anal fissure, after discussing the different theories put forward to account for the formation of fissure, points out that, owing to the anatomical structure of the external sphincter muscle, and the levatores ani muscles, the anal canal receives least support in front and posteriorly. The anatomical arrangement of the muscular structures round the termination of the anal canal is so arranged as to give the greatest amount of support laterally when there is any tendency to over-distension. The external sphincter is not a circular muscle, but

for the most part a longitudinal one, arising from the coccyx to be inserted into the central perineal point, and dividing in the centre to surround the anus. The fibres of the external sphincter lie parallel to the anal opening laterally, but at right angles to it in front and behind. Hence, when pressure is made from within outwards, it is obvious, since muscle fibres are more easily separated than broken at right angles, the weakest point in this muscle must be at the posterior commissure, and the next weakest point at the anterior commissure; and further that the anterior commissure is weaker in women than in men. This accounts for the well-known fact that fissure most commonly occurs at the posterior commissure, and that anterior fissures are more common in women than in men. Moreover, in cases where a tear of the muscle results from too forcible stretching of the sphincter, it invariably gives way at the posterior commissure, thus confirming the fact that this is the common manner of the formation of anal fissure.

Pruritus Ani.—Malcolm Morris points out that in many cases of severe pruritus ani, much benefit results from a thorough flushing of the system with large quantities of **Weak Alkaline Waters**. Short courses of **Calomel** in small doses are also useful. **Scrupulous Cleanliness** is essential, and is insisted upon by all authorities. The patient should be told to keep the anal region as clean as the hands and face. The part should be washed with a soft sponge and warm water; it is better to use Castile soap or oatmeal in place of ordinary soap. Paper as a detergent should not be used, and if possible the patient should accustom himself to have an action of the bowel before going to his morning bath.

I have for some time made it a practice always to examine the rectum and sigmoid flexure with the sigmoidoscope before treating a case of pruritus, and on several occasions I have in this way detected a well-marked chronic catarrhal condition of the rectal mucous membrane, which was undoubtedly the cause of the pruritus. Treatment of the rectal mucosa by suitable injections has in these cases been quickly followed by a cure of the pruritus, often, too, after the patient had for years been treated with external applications.

REFERENCE.—¹*Med. Rec.* June 10, 1905.

APHASIA.

Purves Stewart, M.D.

The current views upon the subject of aphasia, and more especially upon the localization of the various cortical centres concerned in the function of speech, have latterly been accepted almost as matters of course. Recently, however, Marie¹, of Paris, has published a most remarkable paper, in which he maintains that Broca's convolution—the third inferior frontal—plays no special part in the function of speech. He bases his conclusions on the results of a hundred clinical cases, fifty of which were completed by pathological examination. Divesting himself of all preconceived ideas on the subject of aphasia, the illustrious physician of the Bicêtre approached the subject *de novo*. The following are his conclusions:—

The dominant fact in aphasia, according to him, is that in every case there is, on the part of the patient, a deficient comprehension of spoken language. To demonstrate this, the physician must not content himself with merely asking the patient to execute a simple act, and, if it is correctly performed, conclude that the patient's intelligence is perfect. A series of commands should be given, such as the following: "There are on the table three pieces of paper of different sizes. Give me the largest piece, crumple up the middle-sized piece and throw it on the floor, and put the smallest piece in your pocket." Or again, "Stand up, go to the window, and tap three times on it with your finger, then come back to the table, walk round your chair, and sit down." Marie states that in no case of aphasia, however slight, was the patient able to execute such commands correctly. This deficiency cannot be attributed, as is ordinarily done, to word-deafness, since a single part of the command is often correctly executed. On the contrary, the deficiency is due to diminution of intellectual capacity. Careful clinical observation leads Marie to deny the existence of a special word-hearing centre in the first temporal convolution, and to reject the current theories of word-deafness. As to the function of Broca's convolution, inasmuch as profound aphasia may occur when this convolution is intact, whilst its destruction is not necessarily accompanied by aphasia, he therefore concludes that it plays no special part in the function of speech. He does not deny that in about half the cases of aphasia this convolution is found to be affected, nor does he deny the existence of the clinical pictures of motor aphasia, of word-deafness, and of word-blindness; but he regards the different aphasias as different degrees of the same disease. The essential difference between the motor aphasia of Broca and the sensory aphasia of Wernicke, according to Marie, is that in the first the patient is unable to speak, whilst in the latter he can speak, more or less badly. In other words, Broca's aphasia is simply Wernicke's aphasia minus the power of speech. The essential fact of aphasia, of whatever variety, is insufficient comprehension of speech. When to this is superadded anarthria, due to a lesion in the neighbourhood of the lenticular nucleus, we have Broca's aphasia. The intellectual processes of speech are usually localized in the left hemisphere, whilst anarthria may be produced by a lesion of either lenticular nucleus.

Marie then proceeds to describe the pathological appearances found in different cases of aphasia. The lesion is almost always the result of a softening in the territory of the sylvian artery. If the sylvian artery be completely blocked at its point of origin, there will be destruction of two-thirds or three-fourths of the hemisphere, including the basal ganglia and the intervening white matter. The area of affected cortex includes all those parts commonly considered as "speech-centres." If the block of the artery be beyond the point where the lenticulo-striate branches are given off, the basal ganglia escape, but the whole of the areas corresponding to Flechsig's association

areas will still be affected. Still more limited lesions will affect smaller areas of these association-areas; and destruction of any part of this area will produce the intellectual phenomena of aphasia, as defined by Marie, just as a lesion of any part of the sensory cortex will produce hemianæsthesia, or of any part of the higher visual cortex will produce hemianopia, the intensity of the symptom varying according to the extent of cortex destroyed. Broca's aphasia, i.e., intellectual deficiency *plus* anarthria, results only if in addition there be a lesion in the neighbourhood of the lenticular nucleus, or in the adjacent white matter of the temporoparietal lobe.

The above views differ widely from the orthodox theories which have hitherto been current; and the eminence of their author demands that they shall be carefully considered by neurologists. Doubtless they will arouse lively discussion, with the result, let us hope, that a clearer view may be attained of this complicated subject.

REFERENCE.—¹*Sem. Med.* May 23, 1906.

APPENDICITIS (Prevention of).

Robt. Hutchison, M.D.

Tyson¹, in a paper on this subject, remarks that the prophylaxis of appendicitis has been to a great extent lost sight of in the attention which has been bestowed upon the surgical treatment of the disease. He regards it as certain that appendicitis has increased greatly in frequency in the last few years. He believes that "the most prominent and active cause of appendicitis is constipation—a lodgment of undigested matter or fæcal masses in the bowel." There are also, he says, a good many conditions which have increased of late years, which are more or less associated with constipation directly or indirectly, such as oral sepsis, excessive and unnatural eating, unsuitable foods, alcoholism, weakened abdominal muscles, and wrong methods of "stooling." He regards frozen foods as a special source of danger. The preventive treatment of appendicitis must take cognizance of all these factors, and must consist, in particular, in greater attention being paid to thorough daily evacuation of the bowel.

Illoway² also regards constipation as the great predisposing factor in the production of appendicitis. He thinks that fæcal matter is thus allowed to enter the appendix, where it stagnates and permits of the growth of bacteria. By becoming hardened, also, fæcal matter may lead to the formation of concretions. The prophylaxis of appendicitis is therefore synonymous with the careful treatment of habitual constipation.

REFERENCES.—¹*Lancet*, Dec. 23, 1905; ²*Canad. Jour. of Med. and Surg.* Mar. 1905.

APPENDIX (Diseases of).

A. W. Mayo Robson, F.R.C.S.

Appendicostomy.—By appendicostomy is meant an operation for establishing a communication between the cæcum and the surface of the body, which may be used for various purposes in place of a typhlotomy. The operation was first performed by Dr. Weir, of New York, who made use of the appendix to establish a fistula through

which the large bowel might be irrigated in a case of chronic diarrhœa. Since that time many cases have been recorded in which the operation has been employed for colitis and dysentery. It has also been employed in chronic constipation, for the purpose of administering medicine and enemata, and to drain and prevent distension subsequent to operations for intestinal obstruction or after intestinal resection.

C. B. Keetley¹ has performed it in a case of ileocæcal intussusception to anchor the cæcum, and by means of injections to soothe and reduce the inflammation and to check hæmorrhage.

Keetley² also recorded a case in which he had made use of the appendix in place of performing a typhlotomy for relief of intestinal obstruction, and in that paper he advocated appendicostomy in typhoid fever, but so far he had not had the opportunity of applying the treatment.

Sir William Bennett³ supports Ewart's suggestion of the use of appendicostomy for applying local treatment in complicated enteric fever, and further recommended the operation as being an improvement upon rectal feeding and as a substitute for gastrostomy or jejunostomy in very weak and emaciated patients.

W. Ewart⁴, in describing a case in which the appendix had been used for therapeutic purposes, gives a systematic description of the method he employs for irrigation of the cæcum and colon, and also for injection and irrigation of the lower ileum.

"1. *Irrigation of the Cæcum and Colon*.—For this I used a No. 8 male indiarubber catheter, with a very pliable, soft copper wire as stilette, bent upon itself at its extremity to obviate the risk of any injury to the mucous membrane. Dipped in glycerin, the catheter slips easily into the cæcum, where it is apt to coil itself if more than a few inches of its length are introduced, as was shown in a skiagram taken by Mr. F. Thornton Addyman. The largest irrigation used was of 20 pints, supplied from an irrigator under moderate pressure. The patient, placed in the dorsal decubitus, is previously provided with a good-sized rectal tube with attached outflow tube. It is convenient to insert one or two glass joints in the length of both sets of tubing. No pain or undue distension results if the way should remain clear. Should, however, any delay occur in the outflow, other than the normal periodic intermissions due to peristalsis of the colon, it will probably be found that the cæcum has become distended, and that by turning the patient slightly towards the left, the flow will be restored. A judicious use of the clips on the supply tube and on the rectal outflow tube can be made to bring about, if desirable, a moderate state of distension of the entire colon. *Simple injections* for retention in the bowel do not require the rectal tube, which should be removed after the preliminary irrigation. They are conveniently performed with the help of a large surgical syringe.

"2. *Injection and Irrigation of the Lower Ileum*.—As a ready access to the small intestine was part of the object of the operation, in case it should have been diseased, and with a thought also for the

requirements of typhoid fever cases, I directed most of the injections which I myself performed into the small intestine, having previously worked out the method in the dead body with Sir Wm. Bennett. The *modus operandi* is simple, and has been found quite easy by my house physicians as well as by myself. The catheter is bent (not too sharply) to about 110°, at a point two and a half inches from its tip. It is to be introduced, not sagittally as when it is intended for use in the cæcum, but inwards and downwards as well as backwards, in the direction of the nearest spot on the brim of the pelvis. The assurance that the catheter has entered the small intestine is given by the greater length introduced (maximum in this case nine inches), by the subjective sensations of the patient experienced in the hypogastrium even so far as the middle line, by the direct palpation through the abdominal wall sometimes obtained by the operator, and by the skiagram of the stilette *in situ*.

“3. *Systematic Lavage of the Lower Ileum*, such as might be suitable for ulcerative typhoid fever, is best performed with two tubes instead of the single catheter. With the valuable assistance of Mr. Aylen, I have satisfied myself in this case that a therapeutic lavage of the last portion (probably a foot or two) of the ileum could be readily achieved after a preliminary cleansing irrigation. For this special purpose I have introduced side by side a No. 2 and a No. 6 gum catheter but I should prefer the indiarubber instruments if made thinner in the wall. The small catheter is passed through the valve first, in the manner which I have described, to the distance desired, and the larger one is then introduced into the cæcum, where it acts as a draw-off for the fluid injected higher up. This arrangement might enable antiseptics to be used locally which it might not be desirable to expose to absorption by the mucous membrane of the entire colon. The quantity injected being noted, evidence would be obtained that it had been duly recovered from the cæcum, either by simple syphonage, or, if necessary, by aspiration with the syringe. For this lavage the patient should assume a three-quarters right lateral decubitus to promote the descent of the injected fluid into the cæcum.

Although the experience which I have detailed has been gained in a single case, it will probably apply in general outline to the majority of cases. The anatomical relation of the ileocæcal valve to the brim of the pelvis is not liable to much variation, and that which exists between the valve and the entrance to the appendix is also fairly constant; it is in the direction taken by the tail of the latter that the chief individual differences are found, and these would be eliminated by dividing the appendix high up. A short stump would also afford the advantage of a broader way into the bowel, although it might fail perhaps to provide for a faithful sphincter-like action.”

In the same paper Dr. Ewart, in discussing the treatment of typhoid fever by appendicostomy, states :—

“I cordially agree with Mr. Kectley's sentiment that ‘the operative treatment of typhoid fever ought not to mean taking the disease out

of the physician's domain and transferring it to the surgeon's. It is a means of facilitating treatment by the physician.' I still consider that the medical resources for the cure or the curtailment of the typhoid attack are by no means exhausted. But if the knife should prove to be an indispensable accessory to that achievement, I should not decline its service. I also believe that Mr. Keetley's question as to the proper time for surgical interference would then be decided on grounds of public health; and that it would probably be decided in favour of a sterilization of Eberth's bacillus *in situ intestinali* with a minimum of surgery and of the utmost reduction by that way of the spread of typhoid infection."

Curl⁵ compares the relative value of cæcostomy and appendicostomy in the treatment of amœbic dysentery by irrigation of the colon. He has arrived at the conclusion that the operation is not justified in late cases where there is great prostration and great changes in the mucous membrane and submucous tissues of the large intestine. On the other hand, early cases can be controlled by irrigation per rectum combined with proper diet and rest. In "intermediate" cases, in which there is still a reasonable amount of strength but where treatment is not controlling the dysentery, the operation of cæcostomy with irrigation of the colon with quinine solution is indicated. Curl prefers cæcostomy to appendicostomy, because of less sloughing and an easier closure of the fistula. The appendix should be removed at the time of fastening the cæcum in the abdominal wound. A rapid improvement usually follows the beginning of irrigation, but convalescence is slow, and at times difficulty is experienced in closing the fistula. The after-treatment—irrigation, etc.—is tedious, and the patients are offensive cases to have in a ward. All in all, it is the lesser of two evils, but in Curl's opinion it saves lives in selected cases.

Worms as a cause of Appendicitis.—A series of papers has appeared during the past year demonstrating the fact of appendicitis being frequently due to the presence of various parasites. A. Castellani⁶ describes a case in which *Ascaris lumbricoides* was the cause. M. Ovi⁷ described a case in which two specimens of whip-worm, *Tricocephalus dispar*, were embedded in the inflamed appendix. R. F. Moore⁸ mentions another case due to the same cause, and Carson⁹ described two cases in which threadworms, *Oxyuris vermicularis*, were found in the appendix.

Appendicitis Complicating Pregnancy and Parturition.—Although operations for appendicitis have been frequently performed during pregnancy and within a few days of parturition, a case operated on by Hooper, of Melbourne, within an hour of labour, is probably unique. The case is reported fully in the *Intercolonial Medical Journal of Australasia*, May, 1906.

Myer¹⁰ has collected 143 published cases of appendicitis during pregnancy, labour, and the puerperium, and reports a case occurring during the puerperium. Of the collected cases, 52 occurring during pregnancy were not operated upon, and had a maternal mortality of

14 per cent; 69 cases operated upon during pregnancy (with a gangrenous appendix or abscess in 49, or 71 per cent) had a maternal mortality of 32 per cent; 22, both operative and non-operative, occurring during the puerperium had a mortality of 14 per cent.

False Diverticula of the Vermiform Appendix.—In an important paper, M. G. Seelig¹¹ says that diverticula of the intestinal tract are classed as true or false, this classification being based on the histological structure of the wall of the diverticulum. If the wall is made up of all the normal coats of the intestine, the term true diverticulum is used, as in the case of Meckel's diverticulum. If the muscular coat



Fig. 3.

Fig. 3.—Appendix, showing *a*, fully formed diverticulum; *b*, small nodule formed by protrusion of submucosa.

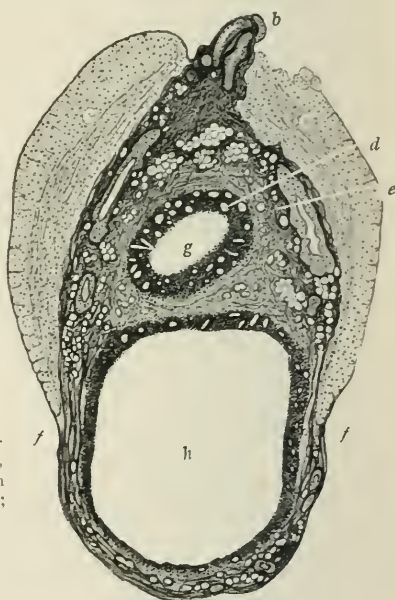


Fig. 4.

is lacking wholly or in part, it is called a false diverticulum. The true diverticula are practically always congenital, whereas the false ones are usually acquired. These facts all hold good for the appendix, in common with the rest of the intestinal tract, although there is no record in literature of an undisputed case of a true diverticulum of the vermiform appendix. Considering the serious clinical import of these pathological structures, it is rather anomalous that they have received such scanty attention in the voluminous literature on diseases of the appendix. If it can be shown that serious involvement of this organ predisposes to diverticula formation, and that these pathological pouches are a menace to life, then another advance has been made in our attempts to link the pathological with the clinical aspect of appendicitis.

Diverticula of the appendix are, says Seelig, of the most serious clinical import; and it is only due to the fact that they have up to now been regarded as pathological curiosities, that their true clinical significance has been overlooked. Undoubtedly, the most dreaded outcome of appendicitis is perforation, with consequent purulent peritonitis. The diverticulum furnishes the most favourable set of conditions for perforation. A thin-walled sac with no muscularis in its make-up, opening into the appendicular lumen, through a mouth that is always small, and therefore easily closed off by swelling of the mucosa or by a plug of fæces, must be a highly dangerous intra-abdominal content. Of course, after an appendix has perforated it is rather fruitless to attempt to show whether the perforation occurred at the site of a former diverticulum or not. Von Brunn and Mertens both assert the belief that cases of perforation under their observation were referable to diverticulum formation. Even granting that a diverticulum does not perforate, it is still a menace, for Helmberger and Martina have shown that it is chiefly the muscular coat of the intestine which opposes the migration of bacteria from within; and in diverticula the muscular coat is absent.

I have seen a number of cases of diverticula of the appendix, but none more pronounced than a case I operated on in November, 1906, in which a diverticulum of the appendix was nearly half an inch long, and opposite the mouth of the diverticulum was a stricture involving the lumen of the appendix. In this case both the lumen of the appendix and the diverticulum contained pus, but the presence of the stricture opposite the mouth of the diverticulum was suggestive, indicating the position in which the inflammation was most persistent. It having there led to ulcer, the cicatrization of which caused stricture.

Tuberculous Appendicitis.—In an important paper, Gabriel Herisson¹² describes three forms: the latent, the acute, and the chronic. The latent forms are rare, only 3 out of 66. The acute form in which the symptoms resemble those of an acute attack of appendicitis, and the chronic form characterized by the gradual development of a tumour accompanied by diarrhoea, are much more common, especially the latter. The acute form of tuberculous appendicitis may end in resolution, in perforation, or in encysted abscess. The treatment recommended is complete extirpation, as if the disease were malignant.¹³

REFERENCES.—¹*Brit. Med. Jour.* 1895, vol. ii. p. 863; ²*Lancet*, April 13, 1906; ³*Ibid.* Feb. 19, 1906; ⁴*Ibid.* May 12, 1906; ⁵*Ann. Surg.* April, 1906; ⁶*Brit. Med. Jour.* Aug. 4, 1906; ⁷*Ibid.*; ⁸*Ibid.* Aug. 18, 1906; ⁹*Brit. Med. Jour.* Mar. 3, 1906; ¹⁰*Amer. Jour. Obst.* Mar. 1906; ¹¹*Ann. Surg.* July, 1906; ¹²*Gaz. d. Hôp.* April 14, 1905; ¹³*Lancet*, Sept. 27, 1902, Mayo Robson.

ARTERIES (Suture of).

Priestley Leech, M.D., F.R.C.S.

Prof. Margarucci¹ records an interesting case of wound of the femoral artery in a young man. He came to the hospital with a large swelling in the left thigh, which restricted movement and walking. Fourteen days previously he had wounded himself with a cobbler's awl, and the wound had been treated simply with a skin suture. The swelling

did not pulsate, but a murmur was heard over it which disappeared when the femoral artery was compressed. The tumour was opened, its contents—red-brown clots—were removed, and then a small longitudinal wound was seen on the anterior wall of the femoral artery. The wound was sutured with No. 0 silk and round intestinal needles, the whole thickness of the artery being included in the suture. A further layer of looped sutures was then passed about 1.5 mm. from the free edges of the arterial wound. Pulsation returned in the arteries of the foot when the elastic band was removed, and the wound healed without further symptoms.

Senni related a case of wound of the brachial artery, which was cut when bleeding a patient. It was sutured with fine silk, and the patient recovered.

REFERENCE.—¹*Il Policl. An.* xiii. fasc. 33, p. 1087.

ARTHRITIS (Pneumococcal).

Robt. Hutchison, M.D.

Before the recognition of the pneumococcus, various stray references to arthritis occurring in cases of pneumonia may be found. Cave¹, however, in 1901, was the first to tabulate in the English journals a series of cases of arthritis in which the micro-organism had been demonstrated in the joint effusions. Thirty-one cases are mentioned, comprising all those published up to that date. Amongst these we find that the joint affection varied from synovitis, with thickening of the synovial membrane and effusion of serous fluid, to intense arthritis with complete erosion of cartilage and baring of the ends of the bones. The severer forms were the more common, the ratio of suppurative cases to serous being as 27 to 5. The larger joints (with the exception of the hip) were more often infected than the smaller. Several articulations were at times affected simultaneously, and often there was a wide-spread infection; thus 6 cases were complicated by endocarditis, 5 by empyema, 6 by meningitis, 2 by pericarditis, and 1 by peritonitis. Two cases are reported in which the joint affection preceded the commencement of the pneumonia by three and seven days respectively, and in 3 cases no pneumonia was ever present, but the character of the joint trouble was demonstrated by the pneumococci in the pus. The disease was much more common in males than in females, and affected the upper extremity rather more frequently than the lower; the knee, however, was the commonest joint to be attacked. Ten cases gave direct evidence of previous injury to the affected joint. Out of 31 cases as many as 23 proved fatal.

Secretan and Wrangham² have published an abstract of 25 cases of pneumococcal arthritis which have been recorded in the English and American journals since the appearance of Cave's paper, and have added another case in a lad of sixteen, in which arthritis of the knee occurred in association with lobar pneumonia, and was cured by operation. Raw³ has also published a case in a man of forty who suffered from alcoholic pneumonia, with consecutive arthritis of the knee. The patient died in spite of operation. Pasteur and Courtauld⁴

record an example of primary pneumococcal arthritis, in a man of twenty-three, which was successfully treated, and refer to 3 other cases which they have collected from other sources.

From all these cases it is obvious that the knee is far most commonly affected, as many as 15 out of 25 having this joint involved. Usually the arthritis is secondary to pneumonia, but occasionally (as in the case of Pasteur and Courtauld) it is primary. Children are much more often affected than adults, especially by primary arthritis, infection probably taking place through the nasopharynx or middle ear.

The most comprehensive study of pneumococcal arthritis as it occurs in children, however, is to be found in a paper by Herzog⁵. He records 3 cases which have been under his own observation, and he has collected from the literature 25 others, all under the age of two years. After a careful study of these cases he finds that the condition is usually confined to one large joint, although in a few cases several joints have been affected. In the monoarthritic group the knee joint was involved in 10 cases, the shoulder in 7, the elbow in 4, and the ankle in 2. In the cases when more than one joint was affected the distribution was as follows: in one case, both shoulders and the left knee; in another, both wrists and the left hip; in a third case, the left ankle and right knee; and in a fourth the right elbow and right knee. In discussing the channel of infection, Herzog points out that in 11 out of the 28 cases no evidence of antecedent pulmonary affection was forthcoming, while in 8 cases of similar character in children between the ages of two and fourteen years there were 5 cases without any antecedent pulmonary focus of the disease. On the other hand, in 55 cases of pneumococcal arthritis in adults, only 4 occurred without pulmonary lesions. From these figures he concludes that other channels than the lung very often serve as the primary focus of the pneumococcal infection in infants and young children.

The most probable primary focus is, according to Herzog, to be found in suppuration of the middle ear due to the pneumococcus. In support of this contention, he quotes some observations recorded by Netter, who found otitis media in 29 out of 31 necropsies on infants under the age of thirty months suffering from pneumococcal infections, with bronchopneumonia in 12, and lobar pneumonia in 1. The anatomical appearances of the affected joints are described as being, in general, similar to those of other suppurative varieties of arthritis, but the destructive changes are usually relatively slight, and evidence of any affection of the bony structures of the joint may be difficult to discover at the time of operation, although in fatal cases it can usually be made out. The capsule of the joints was distinctly thickened in the three cases observed by Herzog. A small piece of the capsule of the hip-joint in one case was examined microscopically, and the capsule as a whole was found to be swollen and thickened, while the synovial membrane of the joint was infiltrated with both mononuclear and polymorphonuclear cells. A section stained by

Gram's method showed a few diplococci more or less uniformly distributed through the tissues of the joint. In one case there was distinct evidence of a pneumococcic septicæmia, for the organisms were found in the spleen, the lungs, and in the bone-marrow, but not in the liver and kidneys. The cultural and staining reactions of the diplococcus were carefully studied, and it was identified as the Fränkel-Weichselbaum pneumococcus, this conclusion being confirmed by inoculation experiments. The explanation offered of the frequency of such joint infections in infants is the peculiar structure and vascular arrangements of the bony rudiments of the joints, for, as shown by Neumann, the capillaries of the bone-marrow in infants are of a larger calibre than the smallest arteries, whereby the blood current is rendered extremely slow, and the deposition of infective organisms in the tissues is favoured. The clinical features of the condition are described as being somewhat characteristic. The skin, especially of the face, is usually pale in spite of the fever, which is usually irregular, the temperature fluctuating between 37° and 40° C. There may be little or no disturbance of the appetite or digestion, and the child may sleep well. This condition, as previously noted by Dudgeon and Branson, is somewhat suggestive, and Herzog agrees with their description. The local condition is that of marked swelling and œdema around one of the larger joints, often involving almost the whole limb. There are tenderness on pressure, and often increased heat, but there is as a rule no circumscribed redness, and this is an important distinguishing feature between pneumococcic and other forms of arthritis. In rare cases there may be an abnormal mobility of the joint. The pus when obtained by puncture of the joint is found to be non-offensive, of creamy consistence, greenish-yellow in colour, and frequently deposits threads of fibrin. The diagnosis of the condition is as a rule not difficult, and can readily be confirmed by bacteriological examination of the pus. It has to be distinguished from gonorrhœal, syphilitic, and tuberculous arthritis, and from joint affections due to the staphylococcus and streptococcus. In the two latter conditions the general symptoms are much more severe, and the local conditions are associated with more inflammatory redness of the skin.

The prognosis of the condition is serious, but under appropriate treatment complete recovery is possible. Among the 28 cases in the literature, 14 recovered, 11 died, while in 3 no statement is given of the ultimate results. The treatment is obviously surgical. Salicylates are useless. The evacuation of the pus by aspiration is but rarely successful and should not be relied on, as valuable time may be lost. The best plan is a thorough opening of the joint, evacuation of the pus, and the removal of the fibrinous threads, which have been described as "veritable nests of diplococci." The wound should be drained for two or three days.

REFERENCES.—¹*Lancet*, Jan. 12, 1901; ²*Brit. Med. Jour.* April 21, 1906; ³*Ibid.* June 16, 1906; ⁴*Lancet*, June 9, 1906 (good bibliography); ⁵*Jahrb. f. Kinderh.* April 2, 1906 (abst. in *Lancet*, May 5, 1906).

ARTHRITIS (Septic).*Priestley Leech, M.D., F.R.C.S.*

G. Rose¹, in a very interesting address, thinks that *acute septic diaphysitis* is the best name for what has been variously called acute periostitis, acute osteomyelitis, acute necrosis, and septic arthritis. The key to the proper understanding of the disease lies in the anatomy and histology of the tissue adjacent to the epiphyseal cartilage. Immediately below this cartilage, and on the diaphyseal side, is a layer of vascular and actively growing embryonic tissue, full of blood-vessels which terminate in loops. This layer of tissue is continuous with a like layer lying underneath the periosteum, and with a third layer on the epiphyseal side of the cartilage. We know the growth of the bone is most active on the diaphyseal side, and the tissue is more tender and susceptible to injury. If, following a trifling injury, a small blood-clot has formed in this tissue on the diaphyseal side of the epiphyseal cartilage, and any germs circulating in the blood find a lodgment in the blood-clot and set up inflammatory processes, we can understand how the different pathological results are produced.

These results will vary according to the bone affected, the age of the child, the amount of ossification of the epiphysis, and the virulence of the invading micro-organism. Take for example the head of the femur, and remember the epiphyseal cartilage in this bone is intra-articular. The micro-organism has found a lodgement in the supposed site in the centre of the bone on the diaphyseal side, and suppuration has resulted. The pus must find vent, and the possible routes are: (a) By penetrating or burrowing through the epiphyseal cartilage and the epiphysis into the joint. (If the epiphysis is ossified, this route will not be possible). (b) By bursting out of the head of the bone. (c) By passing along the surface of the cartilage, and opening a small aperture on the side of the neck of the femur and into the joint. (These three processes in the hip joint will set up a septic arthritis.) (d) In passing to the outside the pus may burrow below the periosteum, and passing down the shaft of the femur, may set up periostitis, and by completely stripping off the periosteum give rise to what has been described as acute necrosis. (e) It may pass downwards into the medulla of the bone and set up osteomyelitis. This last result is not very frequent in the hip joint.

If the disease is situated in the lower end of the femur or the upper or lower end of the tibia, the epiphysis is not intra-articular, and the pus, pursuing the previously mentioned routes, may set up the same conditions; but as septic arthritis can be set up only by the pus following routes (a) or (b), and this is comparatively rare, osteomyelitis is the most frequent result, or osteomyelitis and periostitis, while septic arthritis, in the early stage of the disease, is rare. In operating on early cases, we may find no periostitis; we may drill into the medulla and find no osteomyelitis; but at the epiphyseal cartilage, disease, either central or circumferential, is always to be found.

The method by which the micro-organism gains access to the system is not always discoverable. If the body be examined narrowly, we may find the mark of a recent poisoned wound, and may even discover inflammation of the lymphatics and enlargement of the glands, but often there is no apparent lesion. Still, with decayed teeth, enlarged tonsils, nasal catarrh, and the ubiquity of these micro-organisms, there is no great difficulty in accounting for their entrance.

The diagnosis is seldom made in the early stages, and is not always easy. Acute articular rheumatism and erysipelas are the diseases for which it is most frequently mistaken. Acute articular rheumatism is a frequent diagnosis, and is excusable only when, as is rare, more than one bone is affected. The disease, except at the head of the femur, is not a joint disease; and although the tissue surrounding the joint may be inflamed, it should be remembered that there is no monarthritis in the child. Acute monarthritis due to gonorrhœa we do meet with in the adult, but in a child (excluding the presence of gonorrhœa), if we find an inflamed joint with severe pain associated with grave constitutional symptoms, we may safely conclude that it is acute septic diaphysitis.

There is no doubt about the treatment, which is **Incision**. No time should be lost, as a few hours may make a great difference. It is better to incise and find no pus, than to delay and sacrifice the limb, and possibly the patient, though it does require some nerve to incise into the hip-joint where there are no physical signs of pus. Clean and disinfect the limb, and incise down on the epiphysis at the end of the bone. If pus is found, search for the opening in the bone from which it has escaped, and, if found, enlarge it. If no opening is found, one must be made, and the bone cavity carefully washed out with some sterile or antiseptic solution. If pus be not found, the surgeon should cut into the bone over the site of the epiphyseal cartilage, using a longitudinal incision parallel to the long axis of the bone.

If the constitutional symptoms are severe, with great denudation of the periosteum, amputation should be performed at once.

REFERENCE.—¹*Scot. Med. and Surg. Jour.* April, 1906.

ARTHRITIS, Tuberculous (Bier's Treatment by Passive Congestion). (*See INFLAMMATION*).

ASCITES (in Cirrhosis of the Liver). *A. W. Mayo Robson, F.R.C.S.*

The medical profession owes much to Mr. Sinclair White¹ for the full, careful, and candid report on this subject with which he introduced the discussion in the Surgical Section at Toronto. The whole of the question is now placed before the profession more fully, and the operation and the conditions under which it should be performed can be easily determined.

During the last ten years it has been performed so often that Mr.

Sinclair White has been able to tabulate 227 cases. Of these, 75 died (33 per cent); 34 failed (15 per cent); 29 improved (13 per cent); and 84 were cured (37·3 per cent).

The writer remarks that "the proportion of successful cases published is greater than that of the unsuccessful," therefore even this comparatively small measure of success represents something more than has been actually achieved. Alongside these so-called successful results must also be placed 50 per cent of failures, including 33 per cent of deaths, which it is feared does not include the whole tale of mortality. The operation, then, should not be undertaken until repeated tapping has proved ineffectual. A few months, during which the patient is kept under medical supervision involving abstinence from alcohol, cannot prejudice the result of the graver operation. It would also seem in most cases preferable to try the effect of continuous drainage before performing epiploxy. Complete abstinence from alcohol is essential, and the proneness of these patients to resume their former habits must always constitute a serious hindrance to the success of any method of treatment. Nor should we forget that patients who do not develop ascites generally die from hæmorrhage from a varicose œsophageal vein.

REFERENCE.—¹*Brit. Med. Jour.* Nov. 10, 1906.

ASPERGILLOSIS.

Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.

Baccarani¹ records three cases (two fatal) of this disease occurring in one family. He classifies pseudo-tuberculosis into cases due to—(1) Foreign bodies (china ink, lycopodium powder, cantharides, etc.); (2) Animal parasites; (3) Bacteria other than Koch's bacillus; (4) Moulds.

His cases proved to be due to *Aspergillus fumigatus*. Two presented symptoms of acute tuberculosis and died in six to eight weeks. The third recovered, after fifteen days of milder illness, with generous living and arsenical treatment. In each case the disease was primary, not secondary nor associated with tuberculosis. The reviewer has seen two cases, one associated with cancer, the other with tuberculosis of the lung. The microscopic examination of the sputum settles the diagnosis, but the fact that it may be only an accompaniment of some other pulmonary disease must not be forgotten.

REFERENCE.—¹*Gaz. deg. Osped.* April 20, 1906.

ASTHMA.

Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.

PATHOLOGY.—Alexander Morison¹ agrees with Brodie and Dixon as to the spasmodic nature of the affection. He draws attention to the fact that the bronchial muscles are open to the effect of emotion, though not under the action of the will. He notices the spasmodic contraction of the external muscles of respiration, and points out that much of the dyspnoea is due to the failure of expiration. Francis Hare² is strongly of opinion that the paroxysm of asthma is of vasomotor origin. He points out that vasoconstriction in one part of the body

will soon be followed by vasodilatation in another, and draws attention to the cold extremities in patients during an attack, as evidence of the vasoconstriction of the general area which accompanies vasodilatation in the bronchial area. He reviews some of the well-known factors in the cause and relief of the dyspnoëic attack, e.g., heat to the surface relieves it (general vasodilatation), hot inhalations increase it (local vasodilatation), cold to the surface increases it (general vasoconstriction), cold inhalations relieve it (local vasoconstriction). He gives many other instances, all tending to show that anything which will increase all (or any) of the following:—bronchial turgescence, (vasodilatation), generalized vasoconstriction, the work done by the cardiac systole, the total amount of blood circulating—will increase the dyspnoëa, and vice versa. He frankly champions bronchial turgescence rather than bronchial spasm as a cause. After all, whichever view is taken (turgescence or spasm), these are only results. The question still remains, what causes the vasodilatation (or spasm)? This he answers as follows: “(1) Asthma in some cases depends upon hyperpyræmia, that is, an accumulation in the blood of unoxidized carbonaceous material which is beyond the capacity of the physiological decarbonizing processes; (2) The recurrent paroxysms tend to disperse the accumulation, and may therefore be regarded as ultra-physiological reinforcements of inadequate physiological function—as *pathological functions*, in short.”

The reviewer feels that, while some cases are due to bronchial turgescence, others appear undoubtedly due to bronchial spasm. It is difficult, otherwise than by assuming bronchial spasm as the cause, to explain the immediately relieving effect of chloroform in many cases; and to a certain extent morphia comes in the same category. Further, one can understand spasm becoming *instantaneously* relaxed, with a corresponding *immediate* disappearance of dyspnoëa, but one has never seen turgescence disappear with anything like that rapidity. It would seem, therefore, that those cases (at least) in which dyspnoëa appears, or disappears, with lightning rapidity, can only be explained by the spasm theory; and one has seen many such cases, the result of emotion, fright, or even the change from the lying to the erect posture.

A good deal of work has been done on the blood in asthmatic cases. Heineke³ draws attention (as also others elsewhere) to the great increase of the eosinophiles during the acute attack. Though no satisfactory explanation of this phenomenon has been given, the condition may be useful for distinguishing some cases of asthma from obscure ones of acute pulmonary œdema (see EDEMA OF LUNG), in which the suddenness of the dyspnoëa very much resembles an asthmatic attack.

Nothing new is to be noted this year with regard to treatment.

REFERENCES.—¹*Lancet*, Nov. 25, 1905; ²*New York Med. Jour.* April 7, 1905; ³*Münch. med. Woch.* April 24, 1905.

BACILLURIA. (See NEPHRITIS.)

BALANTIDIUM COLI.*J. W. W. Stephens, M.D.*

Strong¹ considers that this ciliate (which occurs, according to Klein, in nearly every sample of St. Bartholomew's hospital sewage) is of considerable pathological importance. Over a hundred cases are now on record where the parasite has been recorded in man, and in nearly all of these the parasite has been associated with a condition of diarrhœa, and often of mucus and blood. Colic, exhaustion, anæmia, œdema of the feet and ankles, are accompanying phenomena. In about a quarter of the cases there was some connection with pigs or the eating of sausages. Post mortem the balantidia may be found to be still actively motile if examined within five to six hours of the death of the patient. Sections of the gut show balantidia throughout the mucosa in fair numbers, and as the inflammatory process extends, throughout the muscularis mucosæ and submucosa.

It would appear, from a study of the affected tissues, that the lesions are actually due to the invasion of the tissue by the parasites, but whether these can invade tissue which is not already in a state of catarrh remains to be seen.

Balantidium coli is 60–100 μ long by 50–70 μ broad. The peristome when flattened out is triangular. It is common in the cæcum and colon of pigs.

TREATMENT.—Various enemata have been advocated, such as Quinine, preceded by enemata of Ems Salt Water (15 gr. to 1½ litres of water), Tannic Acid, Acetic and Tannic Acids (50 gr. acetic acid and 5 gr. tannic acid to ½ gal. water) and Salicylic Acid (1–1000). By the mouth, Calomel, Naphthalin, and Salol are recommended.

REFERENCE.—¹Manila Biol. Lab. Bull. 1904, No. 26.

BERI-BERI.*J. W. W. Stephens, M.D.*

M. Herzog¹, in a long but clearly written paper, discusses previous observations and records his own.

ETIOLOGY.—The author does not believe that any organism hitherto claimed is the cause, but he does not consider the claims made by Tsuzuki for his coccus.

PATHOLOGY.—The subcutaneous tissue, except in atrophic or old-standing cases, is œdematous. Hydropericardium (66 per cent of cases), ascites, and hydrothorax are frequently seen post mortem. The heart shows very characteristic changes. It is hypertrophied as a whole, but especially the right ventricle, which is also dilated. The kidneys are markedly congested in acute cases. The liver is generally swollen and congested, or may be of a nutmeg appearance. There is, especially in subacute cases of short duration, great hyperæmia of the gastric and duodenal mucosa. The author regards this simply as an effect of the general venous congestion, and not as indicating the portal of entry of the specific cause. The changes in the peripheral nerves, which are the most characteristic morbid process in the disease, are rarely visible to the naked eye.

HISTOPATHOLOGY.—Among the most important changes are:

(1) Interlobular inflammatory foci in the liver ; (2) The most characteristic change in beri-beri, viz., degeneration of the myelin sheath of the peripheral nerves ; the myelin sheath breaks up into balls and beads, and finally disappears, and the axis cylinders show irregular outlines and eventually also disappear. The morbid change is purely degenerative in character, and is so profound that the change could hardly take place in the short time during which the disease has lasted, but is due to an agent which has accumulated during a certain period before any symptoms are manifest.

DIAGNOSIS.—The most important points are: (1) The increase in the pulse-rate, 20 to 30 beats a minute upon slight exertion, e.g., even the act of sitting up in bed ; (2) The characteristic gait, as if walking on clay ; (3) The enlargement of the right ventricle, accentuation of the second pulmonary sound, and reduplication of the second mitral murmur ; (3) The presence of hydropericardium, hydrothorax, and abdominal ascites is of considerable value ; (4) The increase in the patellar reflex in the early stages and the loss in the advanced stages ; (5) Pain in the muscles of the calf, and œdema in the legs and feet ; (6) The great decrease, or even suppression, of the urine in the early stages of the œdematous form ; (7) Hypæsthesia of the lower extremities ; (8) Paralysis and wasting in the legs and thighs, and eventually contractions.

The following conditions may be confounded with beri-beri: (1) *Spinal myelitis*, with increased reflexes, ankle clonus, paralysis of the extremities without wasting, paralysis of the bladder and rectum, complete anæsthesia without pain in the muscles of the calf, no electrical degeneration reaction ; (2) *Landry's paralysis*, with fever, pain in the head, and much perspiration ; (3) *Tabes dorsalis* ; (4) *Anæsthetic leprosy*.

TREATMENT.—A favourite Japanese prescription is the following :—

R	Magnes. Sulph.	30-50 grams		Tinct. Amaræ	4 cc.
	Acid. Muriat. dil.	1·5-2·0 cc.		Aq. dest.	q.s. ad. 200 cc.

M. D.S.: 30 cc. three times per day.

This is continued for about a week, and then, after a few days' intermission, repeated. If the œdema is marked, **Potassium Acetate**, **Potassium Nitrate**, or **Diuretin** should be used.

H. Wright² restates his position with regard to the beri-beri controversy: (1) That beri-beri is an acute infectious disease caused by a specific bacillus ; (2) That the disease is generally preceded by a gastroduodenal syndrome, consisting of dilatation of the stomach and duodenum, and consequent bulging of the epigastrium, vomiting, and perhaps diarrhœa ; (3) There follow signs of acute poisoning of the nervous system due to the absorption of a specific virus, i.e., there occur anæsthesia, flaccid paresis of varying extent, œdema, and cardiac irritability. That this acute poisoning of the neurones reaches a maximum about the twentieth or thirtieth day. The syndrome plus the acute poisoning constitute beri-beri proper. The symptoms may

now change from those of an acute toxæmic to those of a chronic degenerative type, i.e., to a degenerative paralysis residual to the more extensive palsy of acute beri-beri, the so-called beri-beri residual paralysis of Wright.

PATHOLOGY.—Wright states (1) That nearly all cases of beri-beri fatal in the acute stage, first to sixth week, exhibit a neurosis of the gastroduodenal and neighbouring mucosa; (2) That a bacillus is constantly present; (3) That in the acute stage the changes in the peripheral endings of the neurones are of the nature of an acute poisoning, with no signs of degeneration; (4) On the contrary, in the stage of residual paralysis, the peripheral terminations of the involved neurones now show various degrees of true inertia degeneration, Wallerian in appearance, and that this degeneration has migrated towards the trophic centres; (5) Signs of chronic derangement are now found in the body organs, e.g., dilatation of the ventricle and true hypertrophy of the muscle.

L. S. Dudgeon³, who has investigated the above bacillus, finds that it has no action on animals, and is not agglutinated by the sera of beri-beri patients.

Lop⁴ describes an epidemic among the Chinese hands on board ship between Port Said and Marseilles. The cases were confined to those who had consumed provisions (rice and salt fish) bought at Port Said.

Tsuzuki⁵ believes that he has isolated the specific organism of this disease. While other observers have directed their attention mainly to the blood, Tsuzuki investigated the urine, and eventually isolated a diplococcus, which may be termed the *Micrococcus beribericus*. The properties of the diplococcus are the following: (1) 0.4 to 0.5 μ wide, 0.7 to 0.8 μ long; (2) Stains with Gram; (3) Non-motile; (4) Ferments grape and milk sugar, no gas formation; (5) Agar plate, small, semi-transparent colonies, increasing in size and depth of colour; (6) Clots milk after a week; (7) Resists a temperature of 60° C. for one hour.

Serum Diagnosis.—To a fresh broth culture of the coccus, formalin is added to the extent of $\frac{1}{2}$ per cent. The serum of the patient is diluted 25 times. To 1 cc. of this add 1 cc. of the broth culture, giving a dilution of 1-50. Place in the incubator, and examine in twenty-four hours. Results: 106 beri-beri patients examined, 103 positive; controls, 26 examined, 0 positive. The dilution used must not be less than fifty times.

Isolation from the Urine.—Tsuzuki, as implied above, isolated his coccus from the urine, and never succeeded in obtaining it from the blood. The following procedure makes the process easy, as it is possible to use a rabbit immune serum reacting in a dilution of 1000-2000 with the coccus: A drop of the urine passed into a sterile vessel is distributed over the surface of an agar plate. Examine the colonies in twenty-four to forty-eight hours. Inoculate a number of colonies into broth tubes. Incubate for twenty-four hours. If the tube is turbid, add 1 cc. of the diluted serum. Those that react in similar dilutions to the original coccus used for preparing the serum are provisionally accepted as

beri-beri cocci, and are then tested in cultural properties. Out of 65 urines examined, the coccus was isolated in 18, i.e., 27·7 per cent. Control urines (about 65), all negative.

Isolation from Fæces.—Heat the fæces in bouillon for one hour at 60° C.; then proceed as in the examination of urine. The coccus was isolated in 22 out of 38 cases.

Animal Experiments.—The effects are most characteristic. Injections of the soluble toxin or the endotoxin of the coccus produce characteristic changes. Two main forms of the disease result, viz., a cardiac and a paralytic form, as in the disease in man. Further, the post-mortem changes in these two forms are believed by the author to be identical with those of the human disease.

On all these grounds the author believes that beri-beri is an infectious disease produced by the *Micrococcus beribericus* (Tsuzuki).

REFERENCES.—¹*Phil. Jour. Sci.* Sept. 1906; ²*Jour. Trop. Med.* Aug. 1906; ³*Ibid.* Sept. 1906; ⁴*Caducée*, 1905, No. 2, p. 24; ⁵*Arch. f. Schiffs u. Trop. Hyg.* July, 1906.

BILHARZIASIS.

J. W. W. Stephens, M.D.

Stephens and Christophers¹ record the finding of a peculiar spindle-shaped egg in the urine of a Madras native. Its dimensions were 205·2 by 53·2 μ .

C. Goebel² draws attention to analogies between the pathological effects of *Schistosomum hæmatobium* and the new *S. japonicum* (see *Medical Annual*, 1906). Loos has put forward the hypothesis that calculi in Canton and Bangkok and elsewhere may be due to the eggs of this fluke. Goebel points out (1) That in *S. hæmatobium*, tubercles of the serous membranes of the gut may be found due to eggs similar to those described by Miura in Japan for *S. japonicum*; (2) That liver changes, especially thickening of Glisson's capsule, occur in both. In Japanese bilharziasis, however, eggs are apparently not so commonly found in the liver as in bilharzia in Egypt.

Goebel finds that in 68 cases of stone in the bladder in Egypt, 34 could certainly, 10 doubtfully, be attributed to bilharzia infection. 58 stones consisted of primary urinary concretions (urate or oxalate nucleus), 11 of secondary concretions, 3 of triple phosphates. Eggs were only found once in a urate nucleus, in oxalate nuclei 4 times, in phosphate 3 times, and doubtfully 6 times.

W. St. C. Symmers³ describes an unusual case of bilharziasis in which the following conditions were found: (1) Bilharzial fibromata on the serous surface of the intestinal wall; (2) Bilharzial cirrhosis of the liver; (3) Bilharzial fibrosis of the vermiform appendage; (4) Bilharzia ova in the pancreas; (5) Ova in the mesenteric glands; (6) Bilharzial polyposis of the large bowel; (7) Bilharzial papillomata in the lower part of the ileum; (8) Incipient bilharziasis of the urinary bladder; (9) Acute tuberculosis of the lungs and pleura. The author notes that adult worms may be found in the lungs.

REFERENCES.—¹*Lancet*, Nov. 1905; ²*Arch. f. Schiffs u. Trop. Hyg.* Jan. 1906; ³*Studies in Pathology*, Aberdeen, 1906.

BLACKWATER FEVER. (*See* MALARIA.)**BLADDER (Surgery of).***E. Hurry Fenwick, F.R.C.S.*

Ectopia Vesicæ.—The treatment of extroversion of the bladder by extraperitoneal **Transplantation of the Ureters** into the rectum has received considerable attention this year. Lendon¹ claims priority for this operation. His patient was seventeen years old, and has had 25 previous operations for the condition. Both ureters were catheterized, and an attempt was made to transplant them extraperitoneally into the rectum. The left ureter was successfully transplanted, but the right was a failure. Intraperitoneal transplantation of the right ureter into the sigmoid was done later. The patient was able to retain his urine for four or five hours, and remained dry all night.

Newland², following Lendon's procedure, quotes a case of a boy seven years old. Autoplastic operations had been done previously. After catheterization of the ureters, they were dissected up and transplanted into the rectum $1\frac{1}{2}$ in. above the anus. Control over the urine was obtained in one month; there was no incontinence by day, but some at night. A second operation was performed, removing the remaining mucous membrane of the bladder, and a third to remove that of the urethra. He records 8 cases operated upon by various surgeons, with 2 deaths, one two months and the other five days after operation, from pyelonephritis. He claims: (1) Complete control over evacuation of the urine; (2) An irritable and tender mucous membrane is ablated; (3) The odour of ammoniacal decomposition of the urine is avoided. He says carcinoma may supervene in extroversion of the bladder, and quotes two cases in support of this.

Bond³ quotes a successful case in a boy of seventeen. Both ureters were planted separately into the rectum extraperitoneally. His patient passes urine five times in twenty-four hours, ten ounces to a pint being held; but there is pyelitis, with purulent urine.

Moynihan⁴ has advanced the operation a step. His case was nineteen years old, and autoplastic operations had been tried. After catheterization of the ureters, he dissected up the wall of the entire bladder and the ureters, and freely exposed the rectum. The bladder was grafted into the rectum wall, the catheters being brought out at the anus. The catheters were removed in four days. Control was perfect at the end of a month, and the patient can hold his water for a minimum of three hours and a maximum of five.

Lawford Knaggs⁵ reports a case of implanting the ureters into the rectum. He does not say if these were done extraperitoneally. The boy is now able to attend school, and has no incontinence by day, but at night urine and fæces frequently come away in sleep.

Carl Beck⁶ reports a case of intraperitoneal transplantation of the ureters into the sigmoid flexure in a boy aged nine. Autoplastic operations had been done. The patient can hold his urine for four to five hours. Beck considers autoplastic operations are never quite satisfactory, but the procedure is less dangerous than intraperitoneal

operations. He quotes Maydl, however, who had 19 successes out of 22 cases. He does not advise transplantation into the rectum, on account of its immobility.

In considering which operation should be done, the following advantages have been claimed for the extraperitoneal method :—

1. The peritoneum not being opened, there is no risk of peritonitis.

2. The rectum being usually empty, the urine can collect in the vacant space, whilst in the sigmoid solid fæces are usually present.

Both operations bring with them a risk of ascending ureteritis and pyelitis. Moynihan's operation, with deliberate exposure of the rectum and the grafting of the whole bladder into the rectal wall, is probably the best technique.

Rupture of the Bladder.—Marnoch⁷, in recording two cases of ruptured bladder, quotes Jones, who in 54 collected cases finds a death-rate of 48 per cent : but of those, 22 who had been operated upon in the last ten years and had a death-rate of 27½ per cent. Marnoch's first case was an intra- and extraperitoneal rupture, and had the following symptoms :—Pain over the bladder, inability to pass urine, dullness in the flanks, blood in the urine. After injection of the bladder, the whole of the fluid could not be recovered. The abdomen was opened and the peritoneal rupture sutured, and the peritoneum closed completely. The extraperitoneal rupture was sutured and drained. A catheter was tied into the urethra. The patient recovered. In the second case, a woman, there was a desire to micturate, and the passage of a small quantity of blood-stained urine. There was hypogastric pain and dullness in the flanks, and the catheter brought away blood-stained urine. The injection test was negative. The case was complicated by a fracture of the pelvic bones. The cave of Retzius was opened, an extraperitoneal rupture of the bladder found, the wound was drained, the bladder not being sutured. The patient recovered. The complication of fracture of the pelvis in this case with extraperitoneal rupture of the bladder, and the absence of fracture in the intraperitoneal case, is in conformity with the general rule.

Loumeau⁸ records a case of extraperitoneal rupture of the bladder due to vomiting. Acute suppurative inflammation occurred in the cave of Retzius. The inflammatory swelling was incised and drained on the twelfth day. Recovery was rapid.

Vesical Calculus in the Female.—Cumstan⁹, in summing up the treatment of vesical calculus in the female, says : As far as the medical treatment is concerned, it consists in careful **Hygiene** and **Alkaline Medication**, and can only be applied in cases of uric acid or oxalic acid calculi. The surgical treatment consists in **Urethral Dilatation**, vesicovaginal or suprapubic **Cystotomy**, and **Lithotripsy**. Each of each operations has its advantages and its indications. Dilatation is not possible in girls under fifteen years, and will not allow of extraction of calculi exceeding 3 cms. in diameter : it cannot be employed in very elderly women without rupturing the urethra, or

in adults with incontinence of urine due to a weak sphincter. With these exceptions, dilatation is an excellent operation. If, after dilatation, the stone is found too large to be removed intact, a few strokes of the lithotrite will be sufficient to break it up into fragments, which can be removed by the urethra with forceps. Colpocystotomy is to be resorted to in cases where the stone is large or extremely hard, or is developed round foreign bodies; also in cases of vesical infection, where it is necessary to drain the bladder. There exist, however, certain contra-indications, the first of which is a narrow vagina, which will prevent necessary manœuvres, and then the suprapubic route should be adopted. This route allows one to make a much larger opening into the bladder than by any other operation, and is especially suited to the removal of large calculi in young girls, and the removal with the fingers of foreign bodies or large calculi which have become wedged into a diverticulum, without injuring the mucosa: it also gives a perfect view of the interior of the bladder. Lithotripsy also presents a little more difficulty in the female than in the male, owing to the occasional difficulty of filling the female bladder under the influence of narcosis, and being large and low there is no retro-prostatic fundus into which the fragments might drop after crushing. But in the female it is not necessary to reduce the calculus into such small fragments as in the male, on account of the shortness of the urethra and its easy dilatation. Lithotripsy would seem to be the method of choice when the stone is friable and of medium size. It is followed by the spontaneous expulsion of fragments should any be left behind, and allows the patient to resume her ordinary life within a few days, if preceding inflammatory complications of the bladder do not require drainage of the organ.

Bladder Tumours.—

ETIOLOGY.—Lincoln Davis¹⁰, on the examination of 41 cases of primary tumours of the bladder, verified by operation or post mortem, concludes that males are much more frequently attacked than females. The sixth decade in his list showed the largest number of growths. The average age of the patients was fifty-three. The youngest patient was sixteen, but Darling¹¹ quotes a case of sarcoma in a child of four years of age. The oldest patient was seventy-three. Seven of the cases were associated with true calculus of the bladder, but the connection between the two diseases was doubtful.

SYMPTOMATOLOGY.—The early symptoms in the large number of cases recorded were those of cystitis, frequent and painful micturition; but the cardinal symptom, hæmaturia, followed in practically all cases. Out of Davis's 41 cases, 20 had hæmaturia as a primary symptom. The hæmaturia was intermittent at first, usually painless, except in cases of malignant disease, uninfluenced by rest or motion, and unaffected by any therapeutic measures. Sooner or later, secondary symptoms, as those due to infection of the urinary tract, cystitis, pyelitis, pyelonephritis, or to mechanical blocking of the inflow or outflow of urine resulting in hydronephrosis, . . . or retention of urine were present.

With malignant disease, the symptoms were more severe and rapid in development. Incrustation of the tumour with urinary salts, and ulceration, were common.

The DIAGNOSIS of vesical tumour is made by means of the cystoscope. Davis points out the difficulties of diagnosing papilloma from a carcinoma, and states that tumours anatomically benign are often clinically malignant.

The PROGNOSIS of tumours of the bladder is not good. Watson (*supra cit.*), in analyzing 603 cases, 243 being benign and 410 innocent, gives the following figures:—General operative mortality in benign tumours, 17 per cent; in carcinoma, 27 per cent; in sarcoma, 63 per cent. Rapid recurrence of papilloma, 20 per cent. Rapid recurrence of carcinoma, 26·8 per cent. Cases of carcinoma free from recurrence after 10 years, 10 per cent. Davis and Wallace's figures are equally unsatisfactory, Davis having 5 cases of carcinoma, all of whom died within six months.

CONCLUSION.—Davis, in summing up the treatment, voices the general surgical opinion that recurrent epithelial tumours are not necessarily malignant. Papillary tumours of the bladder, histologically benign, may rapidly lead to a fatal result if left alone, but surgical interference at the proper time in the case of pedunculated papillary tumours of the bladder offers a very fair chance of long immunity, if not of permanent cure.

TREATMENT.—All are agreed as to the unsatisfactory condition of the present treatment of tumours of the bladder, and unite in recommending **Early Complete Removal**. The growth should usually be removed by suprapubic cystotomy, but in the female, some cases can be dealt with through the urethra, and some by vaginal cystotomy.

Davis concludes that the method of surgical interference to be preferred in these cases of pedunculated papillary tumours is excision of the tumour *in toto*, with a margin of bladder-wall at its base, including mucosa, submucosa, and muscularis in part. The section need not penetrate the entire thickness of the wall. In this way, a beginning epithelial infiltration of the base, if present, may be circumvented; or if it is not present, the knowledge of the fact is of great value in the important matters of diagnosis and prognosis. The defect in the bladder wall should be closed with sutures, which will at the same time control hæmorrhage. The gravity of the operation is not appreciably increased by this procedure. [The Editor feels bound to draw attention to the danger of sutures or ligatures of the bladder. They are very apt to form the nuclei of subsequent stone.]

F. S. Watson's¹² calls attention to a new method of treatment of cases of bladder-tumour, raising a subject which will require very careful consideration and trial, but as he states, "the proposal can only be put forward as a suggestion, and the writer desires to have it clearly understood that such is his contention in urging the adoption of a plan of treatment that is so radically different from that at present

in vogue, and that he invites the fullest criticism on it." He suggests that "**Total Extirpation of the Bladder**, and of the prostate if it be involved in the pathological processes, be done at the outset of all cases of carcinoma that have not extended beyond the limits of the above-named structures, and in which it is believed that there are no metastases, and that the same measure shall be applied in all cases of benign growths in which recurrence has taken place, after a primary operation for their removal. Ureteral implantation, which contributes, as it seems to me, to the surgical failures, should, I believe, be abandoned, and lumbar nephrostomy with ligation of the ureters done instead, and at some time previous to the operation for the removal of the tumour, as it seems to offer a much safer and less objectionable way of disposing of the difficult part of the latter operation."

As regards the after-condition of a patient with a double urinary fistula in the loin, he states that when good care can be obtained, he is confident that maintaining renal fistula is compatible not only with a useful and active life but with comfort. He thinks it is the safest course under the circumstances in which it is here proposed to employ the procedure, and that it is, moreover, the means of prolonging life, and of preserving the good health of the individual upon whom it is practised.

In a further communication Watson¹³ describes an apparatus to be worn by patients after nephrostomy. One of his patients had worn the apparatus for eleven years on one side, and for four years on both sides. The patient is entirely comfortable, he leads an active business life, there is no odour, and he is entirely dry. The apparatus is carefully described, with photographs and diagrams, in the article.

David Wallace¹⁴, in considering the treatment of tumours of the bladder, lays down the following guiding principles: "Delay operation as long as possible in unfavourable cases; operate in septic cases and in those in which severe hæmorrhage occurs. Suprapubic cystotomy relieves the symptoms, drains the bladder of septic material, and prevents hæmorrhage; frequency of micturition is abolished, and the patient is able to go about in comfort wearing a suitable urinal."

Colt¹⁵ describes suprapubic dressing, and in a further communication gives an improved modification of it, which enables the patient to keep dry. It consists essentially of a glass shield, either cylindrical or oval, which fits over the suprapubic wound, and has a tube leading from it by which all the urine is carried to a receptacle at the side of the bed. The patient is kept perfectly dry, and the wound can readily be attended to through a hollow in the glass shield. A modification of the apparatus can also be adopted for patients who are allowed up.

REFERENCES.—¹*Brit. Med. Jour.* April 28, 1906; ²*Ibid.*; ³*Ibid.* May 29, 1906; ⁴*Ann. Surg.* Feb. 2, 1906; ⁵*Lancet*, Dec. 23, 1906; ⁶*New York Med. Jour.* May, 1906; ⁷*Ann. Surg.* Feb. 2, 1906; ⁸*Jour. de Méd. de Bordeaux*, Nov. 5, 1905, quoted in *Med. Rec.*; ⁹*Jour. Obst. and Gyn.* quoted in *Med. Press*; ¹⁰*Ann. Surg.* April 1, 1906; ¹¹*Ibid.* Dec. 1905; ¹²*Ibid.*, Dec. 1905; ¹³*Ibid.* Mar. 1906; ¹⁴*Med. Press*, June 30, 1906; ¹⁵*Lancet*, Nov. 4, 1905.

BLOOD (Examination of). (See also LEUCOCYTOSIS.)

J. G. Emanuel, B.Sc., M.D., M.R.C.P.

COAGULABILITY OF THE BLOOD.

Sir A. E. Wright and W. E. Paramore¹ describe some interesting therapeutical investigations on the effect produced on the coagulability of the blood by calcium chloride, calcium lactate, magnesium carbonate, cow's milk, and citric acid. J. B. Nias² carried out simultaneous experiments with regard to the lactates of strontium and magnesium. The method employed of measuring the coagulation time of the blood by means of a Wright's capillary tube is first described. The results obtained were as follows:—

1. *Calcium Chloride*.—(a) After the ingestion of one drachm of calcium chloride, the coagulation time was considerably shortened, and this within one hour of its administration. (b) The capacity of different individuals for responding to calcium chloride varied considerably. (c) The calcium salts in the blood were found to be increased in proportion to the shortening of the coagulation time. This suggests that the increased coagulability of the blood is due to the absorption of calcium chloride, and that there is a varying power of absorption of calcium chloride by different individuals. (d) The effect on the coagulation of the blood of a single dose of one drachm of calcium chloride was maintained for periods varying from five to eight days in different cases.

2. *Calcium Lactate* gave similar results, but more readily than the chloride. This accords with the fact that the salts of organic acids, especially of lactic acid, are more readily oxidized in the system, with the result that the base, calcium, is placed more fully at the disposal of the organism when calcium lactate is used than when a mineral acid salt like calcium chloride is administered.

3. *Magnesium Carbonate* gave similar results to those with the calcium salts.

4. The *Lactates* of both *Strontium* and *Magnesium* in doses of 15 to 30 grains were used by Nias, and he concludes that these salts are serviceable substitutes for the salts of calcium when the latter are not absorbed by the alimentary canal.

5. *Cow's Milk*.—The coagulability of the blood is increased by the ingestion of milk, and this is associated with the presence of large quantities of calcium and magnesium salts in the blood. Milk acts, therefore, both as a food and as a medicinal agent. In this latter capacity it may have a beneficial or prejudicial effect, according to circumstances. Advantage may accrue from the prescription of milk in connection with hæmorrhage, aneurysm, physiological albuminuria, and the œdema of Bright's disease, and in all these conditions its use is well recognized.

On the other hand, Wright and Knapp³ have shown that the thrombosis which so frequently occurs in connection with convalescence from typhoid fever almost certainly stands in relation to an excess

of calcium salts furnished to the typhoid fever patient in the exclusively milk dietary which is so generally imposed upon him. A milk diet, it would seem, predisposes to thrombosis.

6. *Continuous administration of Calcium Salts.*—In cases where it is desired to maintain the coagulability of the blood at a high level for some considerable period of time, the salts of calcium must be administered *intermittently*, for an excess of basic salts in the blood has the effect of retarding the coagulation time. In a case of aneurysm of the arch of the aorta treated by Geo. W. Ross, 20 gr. of calcium lactate were administered three times a day for one week; then an interval of four days was allowed to pass, during which no calcium salts were administered, and then the 20 gr. three times a day were repeated for another week, when the dose was diminished to 10 gr. three times a day. Successful administration can, however, only be maintained by frequently repeated determinations of the coagulation time of the blood.

7. *Hypodermic administration of Lime Salts.*—In cases where calcium salts are not absorbed from the alimentary canal, they may be administered by hypodermic injection of calcium lactate. Calcium chloride should *not* be employed hypodermically, and the lactate should *not* be in a more concentrated solution than 1-20. Lactate of calcium $7\frac{1}{2}$ gr. may be employed, but even with this dose there is a risk of local coagulation necrosis, accompanied by great pain and collapse, and Nias recommends the administration of the lactates of strontium or magnesium (15-30 gr.) when the salts of calcium are not absorbed from the alimentary canal, in order not to run the risk of subcutaneous injection, which may be followed by coagulation necrosis at the site of injection.

8. *Citric Acid.*—The administration of citric acid has the effect of decalcifying the blood, and so of diminishing its coagulability, and in this connection it may be employed in the treatment of thrombosis⁴. Experiments show, however, that after the constant exhibition of citric acid for a month or six weeks, the coagulability is increased, and this increase corresponds to an increase in the calcium salts in the blood. This suggests that citric acid precipitates the calcium salts and eliminates them from the blood, but does not cause their excretion, and that after a month or six weeks' constant exhibition of the citric acid, the precipitated calcium salts are brought once again into solution.

Wright suggests that the urticaria which affects some individuals after the use of soap enemata, or after the ingestion of the oxalic acid from rhubarb, or the citric, tartaric, and malic acids from sour fruits, fruit juices, and acid wines, is due to the absorption into the blood of decalcifying agents (of which citric acid is the type) inducing a condition of diminished blood coagulability. This view, moreover, would explain the *rationale* of the employment of magnesium carbonate in the treatment of these "decalcification urticarias."

A simple form of *Clinical Viscosimeter* is described by Denning and Watson⁵. The instrument is made by T. Hawksley, of Oxford Street,

London, W. It consists (*Fig. 5*) of a U-shaped piece of capillary tubing, with the one arm about six centimetres in length, and blown out at its upper end into a cup-shaped receiver with a thin edge (*c*), whilst on the short arm, about two centimetres in length, there is a small elliptical bulb. As the most convenient place from which to take the blood necessary for an estimation, the lobe of the ear is preferred, for not only is it less sensitive than any other part, but it can be made to bleed readily without any manipulation, whilst the position of the hanging drop permits the viscosimeter to be always placed vertically underneath.

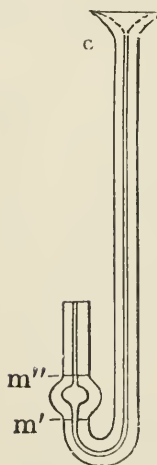


Fig. 5.—Clinical viscosimeter.



Fig. 6.—Showing method of employment of the viscosimeter.

The method is as follows. The lobe of the ear is first well cleaned with ether, and a special fine-pointed knife is then inserted into the most dependent part of the lobe. The viscosimeter, which has previously been warmed to the temperature of the patient's body, in much the same way as a clinical thermometer, is placed beneath the hanging drop of blood (*Fig. 6*) and the receptacle of the instrument is filled. The moving thread of blood is carefully watched through its course down the longer limb and round the bend of the tube; the seconds finger of a stop-watch, which has been held in readiness, is started as soon as the column of blood reaches the point *m'* and is stopped the moment that it gains *m''*. The time, which will now be read off to one-fifth of a second, is that taken by a quantity of blood sufficient to fill the elliptically shaped bulb in flowing through the long capillary arm of the instrument. This time-value, when compared with that given for water, for which the viscosity is well known, gives us directly the

viscosity coefficient of the blood. Observations on healthy people gave values ranging between 4·8 and 5·6 times that of water at blood temperature, whereas in pathological states considerable variations were observed.

BLOOD PLATES.

Kemp, Calhoun, and Harris⁶ give the results of their enumeration of the blood platelets in various conditions of altitude, season, and disease. Their ratio is higher in winter than in summer, and the same increase is observable in high altitudes. With regard to disease they make three generalizations: (1) In acute infectious fevers, e.g., typhoid, the number of blood plates is normal or subnormal, but if the fever ends by crisis, there is a rapid and striking rise in their number. (2) In secondary anæmias they are generally increased in number, but in pernicious anæmia they are greatly diminished, and their count, therefore, is of great diagnostic as well as of prognostic importance. (3) In purpura hæmorrhagica they are enormously diminished in number, and the few that are found are often of large size. The scarcity of the blood plates and the diminished coagulability of the blood, according to Hayem, are pathognomonic and constant signs of the disease.

With regard to the origin and nature of blood plates many views are still held, chief amongst which are the following: (1) They are the remains of the nuclei of normoblasts which have been extruded in the formation of the adult red blood corpuscle. (2) They are degenerated leucocytes. (3) They are degenerated erythrocytes. (4) They are independent morphological elements of the blood. (5) Lastly, Wright, who gave his name to the polychrome staining fluid⁷, holds that the blood plates are detached portions of the cytoplasm or pseudopodia of certain giant cells or megacaryocytes found in the bone-marrow and spleen.

THE BLOOD IN LEAD-POISONING.

Cadwalader⁸, from the study of the blood in 37 cases of lead-poisoning, supports the view that the pallor of plumbism is not wholly due to the slight anæmia present, but possibly is caused in part by a contraction of the peripheral capillaries. The average of the 37 cases showed that the hæmoglobin was reduced to 65 per cent, and that the red corpuscles amounted to 3,850,000 and the leucocytes to 7,568 per cm. As a rule poikilocytosis was not marked, though macrocytes and microcytes were occasionally found. One or more normoblasts were present in all but 4 cases, and megaloblasts in 2, whilst in one case 130 normoblasts and 13 megaloblasts were found in counting 500 white cells, though the red count was scarcely 25 per cent below normal.

REFERENCES.—¹*Lancet*, Oct. 14, 1906; ²*Ibid.* Aug. 18, 1906; ³*Ibid.* Dec. 6, 1902; ⁴*Ibid.*; ⁵*Ibid.* July 14, 1906; ⁶*Jour. Amer. Med. Assoc.* April 7 and 14, 1906; ⁷*Med Ann.* 1906, p. 140; ⁸*Med. Chron.* Sept. 1906.

BOUSSAROLE.*J. W. W. Stephens, M.D.*

The French term for a new dermatomykosis described by L. Audain¹ in Port-au-Prince, Hayti. It attacks the hands and feet, mainly, but also the face. Flat elevations as large as a pin's head or larger appear, and these coalesce. The skin gets puckered and folded. The affected parts itch, and, through scratching, secondary eczema arises, and not uncommonly all the pigment of the (native) skin is lost, and through deposit of scales, areas of a silvery appearance are formed.

REFERENCE.—¹*Arch. f. Schiffs u. Trop. Hyg.* Mar. 1906.

BRAIN (Surgery of).*Priestley Leech, M.D., F.R.C.S.*

J. L. Walton and W. E. Paul, of Boston, lately made a report to the American Neurological Association¹ on the *Operability of Cerebral Tumours*. Their report is founded on the study of 424 cases, which they divide into three classes—operable, inoperable, and doubtful. The operable tumours are those in which lasting relief might be expected from operation, the tumour being primary, accessible, well-defined, and susceptible of removal without cutting into brain-tissue. The great majority of such tumours spring from the dura mater. In the inoperable class the tumour involves the deeper structures of the brain, as well as most cases of multiple growths and of widespread metastases. The doubtful class includes tumours—gliomata and non-encapsulated sarcomata are specifically mentioned—at or near the surface of the brain in accessible regions, many subtentorial tumours and cysts; in the last mentioned nothing beyond evacuation can be accomplished. Applying this classification to the cases collected, they found that no more than 3·3 per cent were operable and 8 per cent were doubtful. Extended search over the surface of the brain is preferable to puncturing the brain substance in search of a deeply-lying tumour—a procedure the futility of which is demonstrated by a series of necropsies.

TECHNIQUE OF OPERATIONS ON THE CENTRAL NERVOUS SYSTEM.

This formed the subject of an address by Sir Victor Horsley² to the meeting of the British Medical Association in 1906. The two prominent characteristics of intracranial disease are the production of optic neuritis, and severe headache and vomiting. Both these symptoms are caused by increased intracranial pressure, and both can be palliated or completely removed by making a sufficiently free opening in the skull and dura mater. In no case should optic neuritis be allowed to continue after it has once been diagnosed. In rare instances it may begin to subside after even the first stage only—opening the skull; it is as a rule necessary to make a free opening in the dura mater to effect this purpose. If the tumour directly involves the optic tract, the neuritis may not be relieved. As regards the condition of vision after surgical treatment, the prognosis depends on the ophthalmoscopic appearances. Yellowish-white stippling, patches of exudation, or opal white atrophic changes, especially when associated with macular figures, all indicate that the secondary changes

in the disc are likely to be permanent, and in proportion to their development will the vision be impaired; whereas, when the loss of vision has been dependent simply on the swelling of the disc, not only is the sight saved, but largely improved. Horsley says that, in his experience, in cases of intracranial tumour the optic neuritis commences on the side of the lesion. Exceptions may be found to this rule, but some of the exceptions found have not been real; for instance, at the time the patient comes under observation the disc on the side of the lesion may be actually subsiding into decadent conditions while the opposite disc is rising into its maximal swelling. The opening is preferably to be made in the basal temporal region of the right side if no attack is to be made on the disease itself. In operating, we should preserve as much as possible of every portion of the encephalon which is not absolutely shown to be diseased.

Details of Operative Procedure.—Usual disinfection of the head and cavities in connection with it, for two days, with carbolic acid and sublimate. Place the patient so that his head is raised, to diminish the pressure in the venous sinuses, and raise the shoulders so that glottic respiration is not interfered with. If the operation is on the cerebellum, the patient is placed on his side, with the uppermost arm drawn downwards. This posture of the head is a serious one for the patient, and it is only to be secured by having a suitable head-rest, such as the fork-rest used by Professor Frazier or Horsley.

Anæsthesia.—Horsley prefers chloroform, but it must be used cautiously, as cases of increased intracranial tension are liable to die at any moment from sudden paralysis of the respiratory centre, and chloroform as often kills by paralysis of the respiratory centre as it does by paralysis of the heart. He has used Vernon Harcourt's apparatus. Two per cent are needed for incision and reflection of the scalp flap, and then 1 per cent for removal of the bone, and after incision of the dura mater it may be lowered to 0.5 per cent until the skin has to be sewn up.

The operating-room should be kept at a temperature of 75° F., and the operating-table should be provided with a suitable hot-water bed. The wound should be constantly irrigated with 1-10,000 perchloride or saline solution placed in an irrigator at 115° F., the use of this hot irrigation fluid being not only to prevent cooling of the nerve centres but to arrest capillary and arterial hæmorrhage.

Hæmorrhage.—The branches of any vessels—either arteries or veins—to be divided should be severed as far as possible from the trunk. For instance, in the monkey the blocking of the large temporo-sphenoidal vein and the most anterior external occipital vein produces softening of the posterior part of the hemisphere. On the whole, the best plan is to tie all the arteries round the lesion before extirpating it, and as the blood-supply of the encephalon is from below upwards, it is better to commence the excision of a lesion by beginning the incision in the brain below, and carrying it upwards and towards the mesial plane. Capillary and arteriole oozing is easily controlled

by means of hot irrigation. All bleeding from veins and sinuses in bone can be arrested by plugging with wax after the periosteum round the hole is completely removed. In wounds of the sinuses and Pacchionian bodies, and venous lakes in the dura mater, the bleeding may be controlled by pressure with the point of an instrument, while the opening is closed by a fine lateral suture on a round needle in the usual way.

Shock.—Dividing the operation into two stages diminishes the shock; the first stage consists in opening the skull, and the second in opening the dura mater and removal of the lesion, the interval between the two stages being about five days. The shock is greatest during the first stage. If a line be drawn from the frontal eminences to the occipital protuberances, more shock results from operations below this line than above. The risk of an operation for decompression is greater if the opening for relief of the compression is not made directly over the lesion. The treatment of shock must be arranged according to the symptoms which threaten life, and these may be grouped according as they affect—(1) Respiration; (2) Circulation; (3) Body temperature. With regard to the respiration, strychnine is of great use in combating the depression of the respiratory centre. The circulation can be maintained by pressure on the surface of the body by bandaging the limbs with cotton wool. The heart does not require stimulating as a rule, but it does require feeding, and repeated enemata (every two hours) of 4 ozs. of beef-tea, in which is dissolved Brand's essence or pancreatized milk, are the readiest means to do this. Alcohol should be avoided, and a small quantity of strong coffee gives all the psychic stimulation of alcohol without its depressant effects, and even if it be vomited within a few minutes, benefit results. Pressure on the brain and sponging of its surface should be avoided as far as possible. If possible, drainage should not be resorted to, and at subsequent dressings an antiseptic should be used—he has most confidence in a mercury salt. As long as cerebrospinal fluid escapes, the most vigorous disinfection of the skin, and frequent changings of the dressings, must be carried out.

The cerebral hemisphere is anchored by emissary veins to the dura mater at various points: (1) In the mesial plane, i.e., to the longitudinal sinus; (2) Laterally, chiefly by the temporo-sphenoidal vein to the lateral sinus opposite the asterion; (3) To a less degree by the occipital vein; and (4) By the anterior temporo-sphenoidal vein, both of which last are but small vessels, but, being terminal, require to be respected none the less. The hemisphere can be readily compressed upwards by inserting a flat spatula cautiously beneath it and the veins just described. The compression must be gradual. Exploration of the ventricles may be done, but care must be taken that blood is prevented from flowing into the ventricular cavity. This may be obviated at the time of operation by the insertion of a simple plug; and when removal of the lesion is completed, a temporary tampon is left in for twenty-four hours, by which time all the oozing vessels are thrombosed.

Malignant disease of the encephalon gives the worst results, but even here, in some cases opening the skull has been followed by relief. As regards the surgical treatment, the following conclusions are justified :—

1. Operation should be resorted to as soon as possible.
2. The tumour should, if possible, be freely exposed, examined, and extirpated with the surrounding tissue.
3. If it cannot be removed without undue interference with important or essential structures, there remains the possibility of the tumour undergoing retrocession in certain cases.

INTRACRANIAL HÆMORRHAGE.

F. Buzzard and J. Cuning³ report a unique case, as they have been unable to find a similar one reported. The patient, a young man of twenty-five years of age, fell on the back of his head, inflicting a small scalp wound, which was dressed a few days later at the Royal Free Hospital. Thirteen days later he came again to the hospital, complaining of constant and increasing headache. The scalp wound was healed, and there was no lump, depression, nor abnormality to be felt. The headache was general; no cranial tenderness; no alteration from normal in the cranial nerves, pupils equal and active; no ocular palsy, nystagmus, hemianopsia, or optic neuritis. The power in all the limbs was preserved, and also co-ordination. The abdominal reflex on the left side was, however, noticed to be absent; the left knee-jerk was more brisk than the right, and an extensor response was obtained on stimulating the sole of the left foot. Temporary diagnosis of intracranial abscess was made. Two days later he came into hospital, and he had meanwhile had attacks of vomiting, and complained of paresis of the left hand and leg. His state was now much worse. He was drowsy, but could be roused, his breath offensive, pulse 60 to 70; hemiplegia involving the lower half of left side of face, left arm, and left leg; sensation impaired over left forearm and fingers and over lower part of left leg; headache intense; vomiting of cerebral type. No optic neuritis, but hemianopsia was present. Exploratory operation, seventeen days after the accident, over area of fissure of Rolando revealed a dark clot underneath the dura mater; this had its origin in a tear of the longitudinal sinus. Part of the clot was brownish in colour, as if it were several days old. Plugging and forceps had to be resorted to to stop the hæmorrhage, as the condition was serious. Fourteen days after, the patient got up, and a fortnight later he went to a convalescent home. There was no fracture of the skull, and the authors attribute the hæmorrhage to the tearing away of a small vein from the longitudinal sinus at the time of the accident.

CLOSURE OF DEFECTS IN THE SKULL.

A. Stieda⁴, of Halle, says that in the surgical clinic of von Bramann an attempt is always made to close the defect in the skull after injury at as early a date and as completely as

possible, because a large defect is in every sense of the word a *locus minoris resistentiæ*. He reports the cases of injuries of the skull from April 1, 1897, to April 1, 1904. In 33 out of 48 cases the particles of bones removed during the exposure of the fracture, or portions of the external table from the immediate vicinity, were implanted. All of these cases showed an exceedingly favourable result. He believes that an effort should be made as soon as possible after the injury to close the traumatic defect with bone according to one of two methods: (1) Primary implantation and closure of the scalp wound, if the area is aseptic and can be kept so; (2) If the wound is healed, he recommends excision of the scar, an osteoplastic operation according to Müller-König, with skin, periosteum, and bone flap, or periosteum and bone flap alone, before an epileptiform or spasmophile change in the brain has taken place.

Enderlen⁵ records two cases where he closed a defect in the skull by grafts from the tibia. He has experimented lately on rabbits and guinea-pigs with Marchand's "spongiosa" for a graft: he finds the method very easy, and it leads to a firm closure. The material is easy to work with, and can be made to fit the defect exactly; the formation of fresh bone takes a long time (in one experiment it was hardly complete after 314 days); the growth of bone takes place from the edge of the original defect.

Carl Beck⁶, of New York, is of opinion that the best method for closure is the osteoplastic method advised by Müller and König. In operations where a cicatrix has been removed from the cortex, the best surety for permanent cure seems to be to prevent firm re-union; the apposition of periosteum and brain must necessarily cause more or less unyielding scars. He thinks he has found a material which shows no marked tendency toward adhesion on the temporal fascia. He reports two cases of what he thinks were Jacksonian epilepsy, treated by cutting a flap and placing the temporal fascia in the defect and the periosteum on the top of the temporal fascia.

Hogarth Pringle⁷ reviews the various methods at present in use. If feasible, the bone removed should be replaced; if the outer portion be too dirty, the inner can be split off the external table, and replaced without sepsis recurring; and if the brain and dura have receded so that the bone, if laid directly upon them, would be much below the level of the rest of the cranium, a satisfactory result may yet be obtained by suturing the fragments of bone to the under surface of the scalp, and so holding them in position until the brain expands to meet them.

If this cannot be done, other methods have to be tried, of which the following are the most important: (1) The implantation of decalcified bone as suggested by Senn; (2) The use of calcined bone (Barth); (3) The use of bone which has been sterilized by boiling (Westermann); (4) The implantation of bone removed from another site in the same patient, e.g., the surface of the tibia (Seydel); (5) The implantation of bone from another species of animal; (6) The

implantation of metal plates, e.g., aluminium (Booth); (7) The use of celluloid plates (Fraenkel); (8) To prevent adhesions between the dura or brain and the margin of the opening in the bone, gold leaf has been employed by Beach, indiarubber tissue by Abbe, and egg membrane by Freeman; (9) The osteoplastic method of König and Müller, which consists in making a skin and bone flap (the latter being a thin layer of bone cut with a chisel) from the skull in the neighbourhood of the existing gap, and turning this flap over to cover the defect. In order to do this, the bone from which the flap is cut must be of fair thickness, and even then, in the process of cutting the flap, it is certain from the shape of the skull to be broken into fragments, any or all of which may necrose, and so defeat the object of the operation. It is said no adhesions form, and the under surface of the bone flap becomes smoothed off, but if there is a defect in the dura mater, it is probable adhesions would form between the brain and the flap. This method is probably only suitable for cases where the gap to be covered in is situated under the hairy scalp.

Hogarth Pringle's personal experience leads him to prefer the implantation of a celluloid plate. Of 6 patients so treated, 3 were successful and 2 failed, the plate requiring to be removed owing to sepsis: the remaining patient had two plates in, one of which healed perfectly, and the other had to be removed owing to sepsis, which had extended from the nasal cavity. One of the three successful cases has worn the plate for eight years, and the other two for three and a half years. In all, asepsis is essential. The celluloid which he has used has been $\frac{1}{16}$ inch in thickness, and when warmed can be moulded to some extent—not so perfectly as silver and aluminium—but its elasticity and resilience are much greater.

Breith⁸ has had very good results from the re-implantation of bone in fracture of the skull. Out of 36 cases, the fragments healed and gave no trouble in 28.

REFERENCES.—¹*Jour. of Nerv. and Ment. Dis.* Aug. 1905, quoted in *Lancet*, Oct. 7, 1905; ²*Lancet*, Aug. 25, 1906; ³*Ibid.* Mar. 24, 1906; ⁴*Proc. Germ. Surg. Congr.* 1905, abst. in *Ann. Surg.* Dec. 1905; ⁵*Corr.-Blatt. f. Schweiz. Aerzte*, May, 1906, p. 310, quoted in *Med. Chron.* Aug. 1906; ⁶*Ann. Surg.* Aug. 1906; ⁷*Brit. Med. Jour.* Feb. 1906; ⁸*Arch. f. klin. Chir.* vol. lxxix. No. 1.

BRAIN TUMOURS AND MENTAL SYMPTOMS.

C. C. Easterbrook, M.D.

P. C. Knapp¹ states that an examination of 104 fatal cases of brain tumour, in which there were mental symptoms during life, and in which the presence of a tumour was verified post mortem, confirmed his opinion that in every case of brain tumour presenting cerebral symptoms, mental symptoms can probably be discovered by a competent observer who has known the patient beforehand. Nearly all Knapp's cases exhibited the mental slowness, confusion, and hebétude characteristic of such patients. The symptoms usually began with somnolence and confusion, and set in early in about half

the cases; profound stupor and delirium (with violent excitement in a few cases) were late manifestations. It was found that the tumour might be located in any part of the brain and yet be accompanied by mental symptoms, thus indicating that every part of the brain, or at least of the cerebrum, is essential to mental integrity. Mental symptoms were found to set in earliest in tumours of the corpus callosum and corpora quadrigemina, next in temporal and frontal tumours, then in other parts of the prosencephalon, with the opticostriate region and the hypophysis; and lastly in the brain stem and cerebellum. Reference may be made here to the case reported by G. V. Gherardini², of a woman of fifty, who after suffering for more than a year from right facial paralysis, deafness of the right ear, and keratitis of the right eye, became the subject of confusional insanity, and died in a fortnight, exhibiting post mortem a fibrosarcoma compressing the right half of the pons Varolii, which was diagnosed during life; also to two cases reported by T. Buzzard³, of tumour in the uncinate region exhibiting sensory symptoms and "dreamy state," and to Anton's⁴ cases of double-sided lesions of the frontal lobes with mental symptoms resembling those of general paralysis. Knapp states that the mental symptoms were more marked in the case of the larger tumours: that a rapidly growing tumour was more apt to show mental symptoms than a slowly increasing one: and that a sarcoma was more often accompanied by delirium. The mental symptoms are said to arise from focal irritation or destruction of psychical tracts and centres, by increasing the intracranial pressure, or by forming toxins, or disturbing the local circulation.

Knapp is thus no believer in the view of one specially psychical centre or region of the brain. As representing this view in its extreme form, C. Phelps⁵ concludes, from a series of 57 cases of lesions of the frontal lobes, that where the lesion affects the right prefrontal region alone it is never attended by mental impairment, and that the left prefrontal lobe is the essential seat of mental processes. C. K. Mills and T. H. Weisenburg⁶ hold that the highest mental functions are prefrontal, especially left prefrontal, and that there are probably special centres for the fundamental functions of attention, volition, judgment, comparison, reasoning, and imagination, and that the position of these centres may be inferred from propinquity to analogous centres in the psychomotor area: thus, the centre for reasoning at the level of Broca's speech centre; the centre for comparison and judgment at the level of the centre for writing; and the centre for attention and volition at the level of the centre for the movements of the head and eyes. In later papers Mills⁷ states that focal lesions of the prefrontal lobe, especially the left, if deep and extensive, may produce loss of memory, attention, will, comparison, judgment, abstract thought, and imagination, and sometimes faint hallucinations and illusions; and that gross lesions of other regions of the brain, if strictly focal, do not produce these symptoms, but are effective in producing hallucinations, illusions, and the other mental symptoms, only if the lesions are

diffuse; and that they produce them by disturbing the association centres and mechanisms, which are said to maintain a balance of function between the different parts of the brain.

T. Grainger Stewart⁸, in 22 cases of tumour of the frontal lobe in front of the ascending frontal gyrus, confirmed by operation or necropsy, found that characteristic mental symptoms were present, namely a change in character, usually gradual, preceding the onset of the general symptoms of intracranial tumour, and therefore requiring careful enquiry from those intimate with the patient, and consisting in alterations of temperament, and specially a tendency to be casual and irresponsible in word or deed, to make irrelevant remarks or ill-timed jokes: or such mental changes as inattention, inability to keep the mind fixed on any subject, incoherence in conversation, loss of memory, especially recent, and slowness or inhibition of thought and retardation of cerebral reaction. These mental changes were more marked when both lobes were affected, and contrary to the finding of Phelps, occurred in typical form in five cases in which the tumour was localized to the right prefrontal lobe. In time, in the case of prefrontal tumours, mania, delusions, or dementia may supervene, and stupor or coma may arise in all cases from increased intracranial pressure.

Diagnosis of Prefrontal Tumours.—Grainger Stewart (op. cit.) states that the diagnosis of prefrontal tumours depends on (1) The presence of general symptoms of intracranial tumour, e.g. headache, vomiting, and optic neuritis; (2) The absence of focal signs pertaining to other regions of the brain; (3) The presence of the characteristic mental symptoms referred to above; and, for localization to the right or left frontal lobe, (4) The nature of any fits which may occur, and (5) The presence of the following unilateral signs; (a) Those homolateral to the tumour, namely the earlier development and greater intensity of the optic neuritis, the presence of a fine vibratory tremor in the extended upper or lower limb, or of focal cranial nerve symptoms, or of local external signs; and (b) Those contralateral to the tumour, namely, diminution of the superficial abdominal or epigastric reflex, the presence of an extensor response of the big toe on stimulation of the sole of the foot (Babinski's sign) or of an indefinite plantar response with increase of the deep reflexes, and the presence of hemiparesis.

REFERENCES.—¹*Brain*, 1906, p. 35; ²*Riv. Speriment. di Fren. tria*, vol. xxxii, fasc. 1-11; ³*Lancet*, June 30, 1906; ⁴*Münch. med. Woch.* July 3, 1906; ⁵*Amer. Jour. Ment. Sci.* Mar. 1906; ⁶*Jour. Amer. Med. Assoc.* Feb. 1906; ⁷*Univ. Pennsylv. Med. Bull.* April to May, 1906, and *B. i. Med. Jour.* Sept. 29, 1906; ⁸*Lancet*, Nov. 3, 1906.

BREAST (Carcinoma of).

Priestley Leech, M.D., F.R.C.S.

There has not been much advance this year in our knowledge of the treatment and diagnosis of cancer of the breast. Lenthal Cheate¹, in remarks on the early recognition of cancer of the breast, says that the management of the early cases needs serious reconsideration. In hospital and private practice the majority of the breast-cancer cases

come for consultation and operation after they have been watched for periods varying from two to twelve months, and often longer. In place of this waiting, a complete macroscopical, and if necessary microscopical, examination should be made. The best position for examination of the breast is for the patient to lie flat on her back on a fairly high table. The breast tissue should not be picked up, but rolled on the underlying tissues by the soft pads on the palmar surfaces of the end of the fingers. By this examination it is found whether both breasts contain nodules, swellings, or irregularities, and whether there are one or more lesions in the affected breast. If multiple nodules or swellings be present, the diagnosis, with some exceptions, is against cancer, and in favour of chronic mastitis or cystic changes. The same applies to the case where both breasts are affected, and though cancer is rare in both breasts, if both are affected one may be the seat of cancer. If only one nodule be found, it may be cancer. Retraction of the skin is another important sign of cancer, and is best obtained by gradually and gently pushing the breast towards that part of the skin to be tested. Flattening of part or of the whole of the curve over the tumour. This is best determined by looking for it with the eyes on a level with the breast.

Occasionally tuberculosis, syphilis, actinomyces, and slowly acting micro-organisms of suppuration—especially if they attack a thick-walled galactocoele—may simulate the clinical signs of cancer. The retraction of the nipple as a sign of cancer is overestimated; if the cancer does not begin under or near the nipple, retraction is a late sign.

Hæmorrhage from the nipple when it is gently squeezed is a serious sign, not necessarily of duct cancer, for it is seen in ordinary alveolar cancer. Clinically Cheatle thinks it impossible to distinguish between duct cancer and the ordinary alveolar type, or a tumour composed of a mixture of the two types; and duct cancer is not always less malignant than the other type. The signs of the doubtful case are as follows: There is a small, possibly tender swelling, and its immediate neighbourhood may be surrounded by some irregularity in one breast only, or there may exist in only one breast one possibly painful or tender area of irregularity. Neither retraction of the skin, flattening of the curve, nor other sign, is present; the only thing one can say is that there is a tumour, but whether it is a cancer or not is uncertain. Recent trauma may cause them, but there would be signs of bruising, and imagined or real injury is so common a factor in breast tumours that the possibility of cancer cannot be ignored. The course to pursue is to put the matter plainly before the patient and ask to be allowed to make a further examination, microscopical if need be.

His method of removing the suspected piece is as follows: An elliptical piece of skin is mapped out, measuring three inches at its widest point, which is placed immediately over the suspected place. This piece of skin is left untouched, but the skin surrounding it is undercut in all directions, and that half of the breast which

contains the suspected tumour is excised, together with the underlying part of the fascia covering the pectoralis major, and the piece of skin comes away undisturbed, with the parts thus removed. The resulting cavity is then soaked with a 1-500 watery solution of perchloride of mercury, the wound is sewn up, and temporarily covered with gauze, until the macroscopical examination is made of the suspected area. If cancer is evident, the gloves and instruments are changed, and the breast is removed. If cancer is not evident, a microscopical examination is made; the tissues are embedded in paraffin, and whole sections of them are cut, and a methodical and deliberate examination is made. Cheatle is a disbeliever in the microscopical examination at the time of the operation as recommended by some surgeons. More than one section, and more than one stain, may be necessary.

C. B. Lockwood² draws attention to some points in the spread of carcinoma of the breast. In all cases, even the very earliest, the glands are affected, and sometimes the upper glands along the axillary vein are larger and seem to be more affected than those lower down. It is better to remove the breast, the fascia, and the pectoral, even

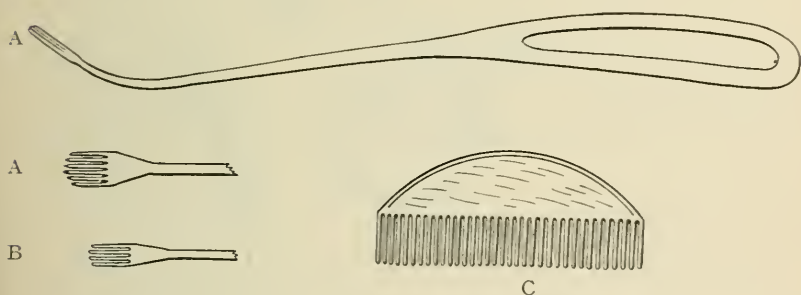


Fig. 7.—Dr. Howard A. Kelly's Steel Comb.

in the earliest cases. If the pectorals are not removed, the glands along the axillary vein cannot be seen. His experience leads him to think that duct carcinoma is not less malignant than other forms. Another curious point is that, in the largest glands, no microscopic evidence of cancer can be found in some cases, and yet there is microscopic evidence of cancer in the smaller glands: Bilton Pollard has noticed the same thing in intestinal cancer.

Farquhar Curtis³ relates several cases of metastases developing over three years after removal of the breast without local recurrence. The same is noticed after removal of carcinoma in other organs, but the freedom from recurrence for some years justifies extensive primary operations.

Schroder⁴ reports 347 cases of excision of the breast, the primary mortality being 4.61 per cent; 182 died from metastases and local recurrence, some patients after the lapse of ten to fourteen years:

53 had secondary operations, and lived from six months to nine years afterwards.

Kelly⁵, of Baltimore, has used for the past three years a steel comb



Fig. 8.—Dr. Carl Beck's method for Removal of the Breast.—Lines of Incision.

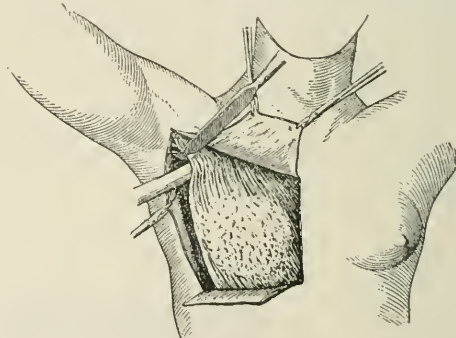


Fig. 9.—Flap reflected and pectoralis major muscle dissected up at its humeral insertion.

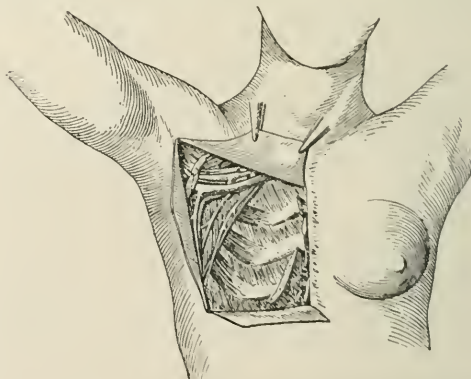


Fig. 10.—Pectoralis major muscle removed and axillary vessels isolated.

(*Fig 7, A*) for making the axillary and sub-clavicular dissection in cancer of the breast. With a pair of forceps and this comb he can

rapidly draw the fat out from the depths away from nerves and great vessels. He is of opinion that a dissection thus made is more perfect, and less liable to distribute any cancerous elements, than one made with the knife. The instrument is 19.5 cm. long, and is curved as



Fig. 11.—Immediately after operation.

shown in the illustration. He sometimes uses a smaller prong (*Fig. 7, B*) for finer work. He has tried also to dissect the peripheral parts of the breast in its lower portion with a larger, coarser instrument (*Fig. 7, C*) but it has not yet proved satisfactory.



Fig. 12.—One week after operation.

Carl Beck⁶ describes a novel incision for removal of the breast. The illustrations, *Figs. 8, 9, 10, 11, 12*, sufficiently explain the various steps of the operation. If co-aptation cannot be easily attained without tension, the lower flap can be made longer by extending the incision line on both sides. The upper end of the incision can be drained by

a wick or small tube for a day or two. He thinks this incision renders apposition easier and with less tension on the flaps. (See also CANCER.)

REFERENCES.—¹*Brit. Med. Jour.* May 26, 1906; ²*Ibid.* Jan. 27, 1906; ³*Ann. Surg.* Feb. 1906; ⁴*Beitr. z. klin. Chir.* Bd. xlv. Hft. 3, quoted in *Amer. Jour. Med. Sci.* April, 1906; ⁵*Ann. Surg.* July, 1906; ⁶*Med. Rec.* July 14, 1906.

BRIGHT'S DISEASE. (See NEPHRITIS.)

BRONCHIECTASIS. *Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.*

CLASSIFICATION AND PATHOLOGY.—Box¹ classifies in the usual way (cylindrical, saccular, trabecular), but also divides cases into acute and chronic. The *acute* occur in cases of bronchitis and pertussis, are unattended by any permanent changes in the lung, and often get quite well. The *chronic* are associated with fibroid induration of the lung, are permanent, though sometimes contracting almost to obliteration. He points out the distinction between chronic cavities which communicate with a bronchus, and bronchiectases, in that the latter are lined with a distinct basement membrane which is not found in the former. In another place² the same observer, speaking of bronchiectasis in children, says of their "honeycombed" lungs: "Some of the cavities are dilated tubes, others dilated atria and infundibula, and others are the result of breaking down, and discharge into bronchioles, of bronchopneumonic patches, especially that form occurring as a complication of measles."

ETIOLOGY.—Box (*loc. cit.*) gives anything causing: (1) *Distension from within*—such as violent coughing, copious and retained secretions, or a foreign body; (2) *Diminished resistance of walls*, occurring in acute and chronic bronchitis, or from inflammatory and atrophic changes; (3) *Traction from without*, caused by the contraction of indurative and fibroid changes in the lung; (4) *The congenital form*, which he says is rare, but does not give any cause.

The association with measles and whooping cough has been already noticed. Boggs³ draws attention to the part frequently played by influenza in this affection, and quotes six cases. In one the course was acute, with bronchopneumonic patches breaking down into cavities, and associated with tube dilatation. Most of the others seem to have been cases of chronic bronchitis or cirrhosis of lung, originating from, or made much worse by, influenza, all being associated with bronchiectasis. His conclusions are:—

1. The influenza bacillus is probably capable of producing extensive pathological changes in the lungs, leading at times to bronchiectasis. The organism may be a secondary invader or associated with other bacteria; the latter may be the preponderant factor. In our small series there was no clinical difference determinable between the pure influenza infections and the mixed or non-influenza cases.

2. The very close clinical resemblance of these cases of bronchiectasis to some cases of chronic tuberculosis with cavity formation, is

important, and may, in the absence of cultural investigations, lead to wrong diagnosis. Physical signs alone, therefore, cannot be relied upon for a positive diagnosis of tuberculosis.

3. Care should be taken to prevent the possible infection of others from these chronic cases having influenza bacilli in the sputum, as the organisms may not have lost their pathogenicity by a continued growth in these old infections.

It is well recognized that influenza frequently lingers in the lungs, and causes many chronic changes there, not infrequently ending in chronic bronchitis and fibroid induration, and, not seldom, being the precursor of tuberculosis. Knowing also that chronic bronchitis and fibroid induration are potent causes of bronchiectasis, one can easily understand the connection between influenza and tube dilatation. It must be remembered, too, that the lungs of patients with chronic bronchitis, bronchiectasis, with or without fibroid induration, are at a disadvantage in getting rid of any catarrhal condition, and that therefore, influenza, coming on the top of such changes, would remain to further cripple the lung.

TREATMENT.—Box concludes that although the lesion is a permanent one in the majority of cases, the condition of the patient can be materially improved in most. He observes that those cases where there is much induration or ulceration of tubes are the most hopeless. He divides the treatment into that for: (1) The pulmonary condition; (2) Complications; (3) General health.

1. *For the Pulmonary Condition.*—(a) To empty the Cavities, either inversion of the patient, expectorants, or emetics. He advises **Expectorants** for two or three days to render the secretions copious and watery, and then an **Emetic** to get rid of them. He also favours the mechanical compression of the chest recommended by Gerhardt.

(b.) The Relief (or Prevention) of Fœtor.—**Inhalations of Antiseptics** by steam or spray, vaporized **Creosote** being the best. The internal administration of antiseptics. **Intratracheal Injections** (not recommended for children or nervous patients): menthol 10, guaiacol 2, olive oil 88 parts: inject 1 to 4 dr.; or 10 per cent solution of **Izal** in glycerin. He strongly recommends the internal administration of **Garlic** oil $\frac{1}{2}$ min. three times a day, in capsules.

(c.) Surgical treatment by incision and drainage is not recommended and is generally dangerous.

2. *For the Complications.*—They call for treatment as they arise: pneumonia, bronchopneumonia, phthisis, abscess, gangrene, hæmoptysis, cerebral abscess, arthritis, fatty and amyloid disease, œdema, and albuminuria must be mentioned; but it must be emphasized that all treatment is directed towards their prevention, by preventing accumulation and decomposition of secretions.

3. *General Treatment* must be directed towards: (a) The reduction of catarrh; (b) The prevention of further bronchial irritation; (c) The improvement of the general health. Climatic treatment is often useful in this way. Breathing exercises and massage are recommended,

PROGNOSIS.—For the “acute” group the outlook is very good. For the “chronic” cases, their future depends on the following considerations: The greater the extent of fibroid induration, the more numerous and larger the cavities, the more frequent and persistent the retention and fœtor of the secretions, the greater the likelihood of fatal complications, or death by gradual prostration.

REFERENCES.—¹*Pract.* June, 1906; ²*Lancet*, Jan. 18, 1906; ³*Amer. Jour. Med. Sci.* June, 1905.

BRONCHOPNEUMONIA. *Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.*

ETIOLOGY AND PATHOLOGY.—Observers are quite agreed that no one organism can be credited as the cause, but that various and often many different organisms are found in the diseased tissues, and sometimes in the blood. It follows, therefore, that in seeking a determining cause other considerations must come in. In this connection, Mackenzie¹ points out the frequency of bronchopneumonia in debilitated patients, due to their weakened condition preventing the unblocking of the catarrhed bronchioles; notes the common position of the disease at the apex or at the fringes or bases of the lungs—those parts which expand least;—and insists upon the great influence which mechanical impediment to the circulation (lymphatic and vascular) has in producing bronchopneumonia or impeding its resolution. In this way blocked bronchioles (bronchitis), blocked lymphatics (catarrh or old disease), blocked veins and arteries (catarrh or old disease), impaired movement from pleuritic adhesion or position of lesion at the apex, fringes, or base, would all have the same effect, viz., that of impeding circulation; and so induce the supervention of bronchopneumonia on bronchitis, and prevent its resolution.

Complications.—Mackenzie reports cases of abscess of lung in connection with bronchopneumonia. Three varieties are given: (1) Minute, punctiform, due to the softening in the centre of a lobule. These are early and acute, 3 in 34 post-mortems; (2) Size of a cherry-stone, or even of a cherry 2 in 130 post-mortems. These two varieties occur during the acute process, and cannot be detected during life. (3) Where an abscess of varying size presents itself after the acute stage has passed and the pneumonic symptoms have subsided. This third variety may be suspected when the temperature rises again after having fallen, where this rise cannot be otherwise explained. Slight impairment of resonance at one or other base may be the only physical sign.

The diagnosis must be made from: (a) Empyema (negative result to puncture); (b) Relapsed pneumonia (no pulmonary distress or physical signs); (c) Tuberculous bronchial glands (no evidence of tubercle elsewhere); (d) Tuberculous infection of lung (no tubercle bacilli in sputa); (e) Malignant endocarditis (no signs of cardiac lesion).

Mackenzie² reports another case, due to *Staphylococcus aureus*, in which, in addition to patches of bronchopneumonia and “alveolar

atelectasis" in the lung, there were numerous small abscesses on the endocardial surface and on the surfaces of the liver and kidneys, all showing a pure culture of *Staphylococcus aureus*. It is pointed out how frequently the organism has been demonstrated in the blood in such cases, and the likelihood of the supervention of pyæmia is emphasized.

TREATMENT.—The reviewer would urge the importance of **Preventive Treatment**, in that so many cases of bronchopneumonia arise solely on account of neglect in cases of bronchitis, especially in connection with measles, whooping cough, and influenza. Similarly, neglect is often directly responsible for the supervention of complications, lack of proper resolution, and drifting into tuberculosis, not infrequently seen after attacks of bronchopneumonia.

REFERENCES.—¹*Glas. Med. Jour.* April, 1906; ²*Lancet*, May 12, 1906.

CANCER.

W. Sampson Handley, M.S., F.R.C.S.

THE CAUSATION OF CANCER.

The *doyen* of English pathologists, Sir Samuel Wilks¹, whose first paper on cancer was published forty-nine years ago, reminds us, in his latest contribution to the subject, that just as bacteriology was impossible until the discovery of the microscope, so perhaps the solution of the problem of cancer requires instruments and methods as yet undreamed of. However this may be, the work done in connection with the fundamental problem of cancer—its causation—has been during the past year or two rather critical and exclusive than constructive. There are still three main schools of thought. According to the *parasitic theory*, cancer (carcinoma or sarcoma) is the reaction of the tissues to invasion by a specific parasite. There is now a consensus of opinion that the cell inclusions (Plimmer's bodies) found in cancer are not of parasitic nature, and interest has of late centred in the presence of micrococci in growths, pointed out by Doyen. The main difficulty which confronts the advocates of the parasitic theory is, that the apparently limitless proliferative power of malignant cells has no analogy to the limited reactive cell-proliferation which results from invasion of the tissues by any known parasite. A second, or *intrinsic theory*, holds that cancer springs from some deep-seated intrinsic change, or acquired vice, in the physiology of one or more of the normal cells of the body. Yet a third theory, the *inclusion theory* of Cohnheim, which is certainly true in part, holds that morbid growths arise from segregated groups of embryonic cells which have lain dormant and undifferentiated among the adult tissues of the body. The best recent summary of the debatable questions connected with the etiology of cancer, is to be found in a paper by E. H. Nichols², of Harvard.

H. T. Butlin³ upholds the view that carcinoma is a parasitic disease, inasmuch as the carcinoma cell must be regarded as a parasitic protozoon, which may be descended from the tissue cells of the host, or may be a parasite from without. The former

proposition—which on his view implies the origin of new species of protozoa from the cells of the human organism—he is inclined to regard as unlikely. He lays stress on the observation that the cells of Jensen's mouse-carcinoma can survive outside the body for as long as eighteen days, and that they are known to be subsequently inoculable into healthy mice. Such appear to be Butlin's views, but in the absence of conclusive evidence he holds the balance between opposing hypotheses with such dialectical skill that, according to W. B. Ransom⁴, he denies for the carcinoma cell "any material basis either of intrinsic or extrinsic derivation." The reader may therefore be referred to the original lecture.

In connection with this subject it may be noted that Prof. D. A. Welsh⁵, of Sydney, has attempted to transplant normal epithelial cells of the chorion, ovary, thyroid, etc., into other parts of the same animal, and into other animals of the same or an allied species. He obtained only one positive result. Chorionic epithelium from a guinea-pig was transferred into the peritoneal sac of another guinea-pig. The latter animal died later, and a large mass of recently-extravasated blood, containing proliferating chorionic epithelium, was found in its pelvis. E. H. Nichols⁶, in a similar series of experiments, obtained only negative results.

The Micrococcus Neoformans.—The occurrence of micrococci in cancerous tumours in a certain proportion of cases, pointed out by Doyen, has been confirmed by Metchnikoff and others, and may be taken as well established, but it is by no means certain that these micrococci are the cause of the disease. Doyen himself points out the similarity of the *M. neoformans* to the staphylococcus, an organism which, as Dudgeon and Sargent have shown, rapidly establishes itself in the effused blood of internal (peritoneal) hæmorrhages. It may be that the unstable tissue of a neoplasm lends itself, like effused blood, to secondary invasion by micro-organisms. Doyen⁷ thus describes the method of obtaining the *M. neoformans*, and its general characteristics:—

"The pieces, removed with strict aseptic precautions from the tumours or the glands, should be cultivated in tubes containing a very small quantity of bouillon from the udder of a cow, to which is added 0.5 per cent of chloride of sodium and 1.2 per cent of Chapoteaut's peptone. The development of the *M. neoformans* is better carried out if the neoplastic fragment is bathed by the bouillon without being entirely immersed in it.

"The bouillon becomes turbid sometimes in eighteen or twenty-four hours, sometimes only in two, three, four, or five days. During the first phase of the culture, isolated microbes, diplococci, triads, and tetrads, come especially under observation; later on, numerous chains, having from five to nine elementary parts, are seen, which have a tendency to bifurcate in the form of a Y. The elementary parts of the *M. neoformans* are of a very irregular diameter; their mean diameter is 0.5 μ , the smaller ones being 0.2 μ , the larger 2 μ ."

In tumours and fresh cancerous juice there are but a small number of micrococci that can be coloured by Gram's method. The sections may be stained during twenty-four hours by means of a 10 per cent solution of Giemsa's reagent (Grübler) in ordinary sterilized water, and the colour is removed by water, either pure, or with addition of a few drops of methylic alcohol. The background of the preparation remains of a blue colour, and the *M. neoformans* is shown up by a reddish purple staining. Such preparations are very difficult to bring to a successful issue.

"The microbe, as soon as it is developed in the bouillon, can be stained by Gram's method, though it soon loses, at least partially, the property of remaining coloured under the action of iodine. In old cultures, coloured by carbolized violet and Gram's method with double staining by weak fuchsin, only a small number of cells, sometimes the halves of micrococci, can be seen having a violet colour, and the red staining predominates. The *M. neoformans* is differentiated from all other kinds previously described, by its morphology, by the character of its cultures on agar and gelatin, and by its pathogenic properties.

"1. *Morphology*.—To the educated eye the young cultures, containing little else but diplococci of unequal beading, are characteristic. At the end of from two to three days, the Y-shaped bodies, and the little chains of 5 to 9 elements, can be observed, rarely anything beyond these.

"2. *Characters of the Cultures on Agar or Gelatin*.—The bouillon culture transplanted on to ordinary agar, develops as a layer, having a greyish white colour, shining, very thin, and fluorescent to transmitted light. At the end of from twenty-four to forty-eight hours, it is seen that the culture is adherent to the agar, and has become fixed as viscous filaments to the platinum needle. As it gets older, the culture becomes almost transparent. On gelatin, with stab culture, liquefaction commences about the fourth day, and rarely reaches the whole of the centre."

According to Sir A. E. Wright, the *M. neoformans* differs from the staphylococcus in the following particulars:—

(1) When first taken from the body it gives only very sparing cultures on ordinary agar; (2) In film preparations it is arranged, not in clusters like the staphylococcus, but in short chains, and in particular in Y-shaped figures, i.e., in short bifurcating chains; (3) It is agglutinated by normal human serum, even when the serum is diluted 200 times; (4) Blood which possesses a high opsonic power to the *M. neoformans*, may possess a low opsonic index in respect to the staphylococcus, and *vice versa*.

A. Paine and D. J. Morgan⁸, working at the Cancer Hospital, made a bacterial examination of 44 tumours, all but 9 of which were malignant. The *M. neoformans* was found in 1 of 7 cases of epithelioma, in 7 of 25 breast cancers, in 2 of 3 cases of sarcoma, and in a case of myxoma. While the *M. neoformans* occurred only

in 11 cases, a streptococcus was found in 13 cases. In 16 cases the tumour was found to be sterile.

Doyen, by inoculating cultures of the *M. neoformans* into animals, has produced lesions, especially in the liver, which have some analogy to small sarcomatous nodules. He states also that he has obtained miliary enchondromata of the lungs. This part of his work is at present entirely unconvincing, though it represents, as he states, the labours of five years.

By repeatedly injecting cultures of the *M. neoformans* into animals, and subsequently drawing off their blood, Doyen prepared a serum which he has used largely in the treatment of cancer, with results that he claims as satisfactory (*see below*).

Unusual Forms of Mitosis in Cancer.—In 1903, Farmer, Moore, and Walker⁹, following up the work of von Hanseemann on anaplasia, described the occurrence in malignant tissues of certain forms of nuclear division, characterized by the reduction of the number of chromosomes to about one half the normal. On account of the close resemblance between these forms of mitosis, and those characteristic of reproductive (gametic) tissue, these authors designated the mature malignant cell as "gametoid," to indicate its affinity with the reproductive tissues. They described two forms of gametoid mitosis as occurring in malignant growths. These two forms, known as the heterotype and the homotype mitosis, were stated to be pathognomonic of malignancy¹⁰.

The presence of heterotype mitoses in malignant growths of various animals was recorded by Bashford and Murray¹¹, but their occurrence was not stated by these authors to be an infallible indication of malignancy. Appearances indicating the occurrence of nuclear fusion between adjacent cancer cells, recorded in the same report, have since been admitted by Bashford to be fallacious.

Victor Bonney, working at the Middlesex Hospital, has definitely disproved the view that "gametoid" mitoses are characteristic of malignant tissue. In 1904 he showed the presence of gametoid mitosis in papilliferous ovarian cysts, growths which exhibit "every degree of epithelial activity between frank innocence and undoubted malignancy." More recently he has shown¹² that gametoid mitosis is present in the so-called "gonorrhœal wart." It may therefore be stated as a fact that the presence of gametoid mitosis is no criterion of malignancy.

In a paper read before the Royal Society, Bashford and Murray¹³ have expressed the view that the nuclear figures in cancer cells, believed to indicate the occurrence of a true "reducing division," are in reality of ordinary somatic type. They now believe that multipolar mitosis, and the other irregular forms of cell-division in tumours, studied by von Hanseemann, are in themselves sufficient to account for the diminution in the number of chromosomes.

Cell inclusions (Plimmer's bodies) in Carcinoma.—The work of Plimmer upon cell inclusions in cancer is well known, and does not

need to be recapitulated here. Plimmer's bodies are round or oval bodies in the cell protoplasm, of any size up to and exceeding that of the nucleus, with a peripheral border which is often rayed, and a central body of round or irregular shape, separated from the peripheral margin by a clear space.

C. E. Walker¹⁴ expresses the opinion that Plimmer's bodies represent the archoplasmic vesicle which is formed in the first heterotype mitosis of gametic tissue.

Greenough¹⁵, in a thoughtful and convincing paper which is the result of years of work, states his belief that Plimmer's bodies, and the so-called "cancer parasites" which conform to the type described by Plimmer, are really vacuoles in the cell protoplasm containing a material which is coagulated and shrunk during the process of fixation. This material is to be regarded in most cases as a secretion of the cancer cell. In conformity with this view, Greenough finds that Plimmer's bodies are practically constant in cancer of glandular origin, while they are absent in epithelioma and in sarcoma, the cells of which have originally no secreting function. Moreover, in adenocarcinoma, Plimmer's bodies are found between the nucleus and the free luminal surface of the cell, in the position which is taken up by the secretory products of a normal epithelial cell. They are very rarely found in cells which present active mitotic changes, whereas, if they were pathogenic parasites, they should be associated with irritative proliferation of the cell in which they occur. They are found more abundantly in cancers of slow growth, in which the cells have not abandoned their functions so utterly as in rapidly growing cancers. Similar bodies have frequently been found by Greenough in chronic mastitis. The reader who rejects Greenough's view has a choice between the following theories of the nature of Plimmer's bodies. They may be (1) Parasitic; (2) Due to degeneration of cells and anomalous secretion; (3) Produced by cell invagination; (4) Abortive and pathological mitoses; (5) Special organs of the cell archoplasm or paranucleus (Borrel, Bashford, Walker); (6) Extracellular hyaline drops (Russell's bodies); (7) Cancer cells themselves. The list is quoted from Hanseemann. The view that Plimmer's bodies are parasites has now been almost universally abandoned.

Is Cancer Contagious?—Cases of cancer continue to be recorded as occurring almost simultaneously in husband and wife, or in two persons closely associated in the home or workshop. Thus S. Lloyd¹⁶ records five such cases in his own personal experience. The most striking of these was that of an engineer, who died of cancer of the tongue. About a year later the night engineer working in the same place developed cancer of the anterior pillar of the fauces. The two men had used the same drinking cup for several years. Lloyd believes that exfoliated cancer cells may give rise to cancer by actual implantation into the tissues of a new host.

In a case in my own practice, the husband developed cancer of the breast within a year of his wife's death from cancer of the uterus.

Such cases are not sufficiently numerous to be inexplicable as mere coincidences, but, nevertheless, precautions against the possibility of contagion should be adopted. As Lloyd says, all contact with cancerous ulcers, and the common use of beds, utensils, drinking vessels, linen, etc., with cancerous patients, should be forbidden. The avoidance of direct contact, as in kissing, is advisable. Dressings removed from cancerous ulcers should be burnt.

The Origin of Malignant from Simple Tumours.—W. H. Clayton Greene¹⁷, in a thoughtful paper, maintains that no clear line can be drawn between simple and malignant tumours. He points out that the accepted criteria of innocency are not reliable. A simple growth may increase as rapidly as some carcinomata; a capsule is not constantly present in simple growths, while it may be found in early carcinomata and sarcomata. Simple tumours do not recur if completely removed, but neither do malignant ones. Following Ribbert, he regards both simple and malignant tumours as expressions of a loss of tissue equilibrium. The disturbance varies only in degree, and in this respect a simple tumour may be compared to a localized bacterial infection, and a malignant tumour to a bacterial septicæmia. In either case, the body is infected by parasites, which, in the case of tumours, simple or malignant, are cells derived from its own substance. All forms between the benign and the malignant are seen in the tumours which arise from suprarenal rests. In fact, simple tumours are potentially malignant in that they show a weak spot in the body which may readily be attacked by cancerous change—many of them, from the earliest period of their conception, tending to that end. In the interests of cancer prophylaxis, all simple tumours should, in his opinion, be removed.

This opinion accords with the main practical conclusion of Bland-Sutton's¹⁸ classical work on tumours, namely, that thorough removal of the tumour, whether it be innocent or malignant, should be undertaken at the earliest possible moment.

Injury and Irritation as Exciting Causes of Malignant Growths.—Röpkke¹⁹ has investigated the influence of trauma in the production of carcinoma and sarcoma in a series of 800 cases. He finds that carcinoma is likely to result from long-continued irritation, while sarcoma is more often the result of a single injury. He found that sharp and carious teeth are the most frequent cause of oral carcinoma. Cancers of the face and scalp are frequently preceded by seborrhœa senilis or by warts. In eight cases cancer of the breast was preceded by acute trauma. A melanosarcoma of the palate apparently arose from an ulcer caused by the pressure of a dental plate. It is a striking fact that sarcoma of the extremities occurred 17 times after a single definite trauma.

IS CANCER ON THE INCREASE ?

It may be doubted whether this question is capable of final solution until the law insists on post-mortem section of every dead body. In

interpreting statistics which bear on the question, it must be remembered that results obtained in one country are not applicable to another. Moreover, when the deaths from cancer are stated in proportion to the total mortality—and not in proportion to the population living—it must be borne in mind that the recent diminution in infantile mortality, and in deaths from tuberculosis, diphtheria, etc., will produce an apparent increase in the mortality from cancer. The survival of persons who in former days would have died of diseases now curable or preventable, also allows a greater percentage of the population to reach the cancer age, and must tend to a real increase in the incidence of cancer per thousand of the population. These considerations must be allowed some weight as partly discounting the significance of the increase in the mortality from cancer which appears to be undoubtedly occurring.

In England, Lazarus-Barlow and Gordon Taylor²⁰ have attacked the question in a novel and ingenious manner, by means of the clinical records of the Middlesex and St. George's Hospitals. Taking all the cases which have died, from whatever cause, in these two hospitals, at an age of 35 or upwards, each patient has been indexed (along with the cause of his subsequent death) under the year when he was 35 years of age, and a population aged 35 has thus been formed for each year over a period of about 80 years. For each year of that period it thus became possible to state what was the average expectation of death from cancer, among a population—doubtless a somewhat artificial one—aged 35 in that year. In all, 13,061 cases from the Middlesex Hospital, and, separately, 13,840 cases from St. George's Hospital, were analysed. To obtain these cases, the records of about 245,000 admissions had to be scanned. The experience of each hospital is that, in the case of females, the cancer mortality gradually rose, up to about the year 1870, and has since been stationary; while in the case of males there has been a slow, persistent rise in cancer mortality, up to the present time. The tendency is for cancer to affect both males and females at an earlier age than formerly.

According to King and Newsholme²¹, whose results have been confirmed by Bashford, the recent increase in the number of recorded deaths from cancer occurs chiefly in cancer of deeply-seated organs, and is due, mainly at any rate, not to a real increase in the disease, but to improved methods of diagnosis. But the increase in cancer mortality shows itself not only in statistics based merely on death certificates, but in others based entirely on necropsies, and therefore not liable to the objection raised.

In Germany, Juliusberger²², working on the statistics of a leading insurance company, found that, between the years 1885 and 1899, there was a progressive increase of cancer mortality, amounting to 1 per cent in males, and 1·5 per cent in females.

Tuttle quotes from Weinberg and Gasper²³ the following statistics, based upon necropsies, of the incidence of cancer in the city of Stuttgart. From 1873 to 1883 there were 556 deaths from cancer in the alimentary

tract, and 372 from cancer in other organs ; from 1893 to 1903 there were 1005 deaths from cancer in the alimentary tract, and 382 from cancer in other organs. The very large increase in cancer of the alimentary tract, and especially of the stomach, in recent years, is a phenomenon which has been noted by other observers. The increase was relatively greater among males.

According to J. Nevins Hyde²⁴, in the census-year 1900, 29,475 deaths from cancer occurred in the *United States*, 11,436 in males, and 18,039 in females. The proportion of cancerous fatalities in 1000 deaths was 29·5. At the previous census in 1890 the proportion of cancer-deaths was only 22·5 per thousand.

In comparison with the statistics of the preceding ten years, the increase in the death-rate due to cancer and tumour ranges from 15 per cent in the cities to 27 per cent in the rural districts.

Liability of the Dark Races to Cancer.—J. Nevins Hyde²⁵, in the course of a paper in which he attempts to prove that the action of light, and especially of the ultra-violet rays, is a predominant factor in the etiology of cancer, shows that the negro is much less susceptible to cancer than the white man. In the registration area of the United States, an area from which some of the Southern States are excluded, the deaths from cancer per 100,000 of the population in 1900 were as follows: whites 66·7, coloured population 47·7. The relative incidence of cancer in the various states, and the smaller incidence of cancer in states with a large coloured population, may be studied in the accompanying map (*Plate I*), taken from the U.S. Census Report for 1900, and kindly furnished by the *American Journal of Medical Science*. The deeper-tinted belt bordering the Gulf of Mexico to the westward is not visible on the Florida coast. The presumable explanation is that on the Florida coast, which is destitute of large seaports, there are fewer invasions by the whites for the exchange of commodities ; while the other States bordering on the Gulf have numerous seaports spread from Mobile to Galveston, all of them attracting the presence of numbers of white people.

*In British Colonies*²⁶.—Among the natives of British Central Africa, H. Hearsey finds that cancer, though it occurs, is of the utmost rarity, while non-malignant growths are relatively common.

P. Clark, of Hong Kong, found that the mortality from cancer among the Chinese in Hong Kong from 1895–1904 averaged per annum only 4·45 per 100,000 of the population. The corresponding average in England for the period 1891–5 was 71 per 100,000, a striking difference. Among 15,365 necropsies made on the bodies of Chinese in Hong Kong, only ten cases of cancer occurred. Clark points out that the Chinese in Hong Kong smoke and chew but little ; they live mainly on rice, with small quantities of fish or pork, and use condiments very sparingly.

A. J. Craigen, of British New Guinea, has not seen a single case of cancer among the natives in four years. The Papuans cook all their food, and live mainly on a vegetable diet, with fish, and occasionally

meat. The occurrence of cancer among the natives of the Malay States, of Sierra Leone (rarely), of Jamaica, and of Ceylon (rarely), is noted in the Blue-book.

From *India*²⁷ during 1904, 146 cases of malignant new growth were reported to the Imperial Cancer Research Fund among vegetarian natives, 137 among natives living mainly on flesh diet, and 222 among natives living on a mixed diet.

THE COMPARATIVE PATHOLOGY OF CANCER.

Certain schools of cancer research have been occupied mainly with the study of cancer in the lower animals. The method has the great advantage that it enables direct experimental methods to be used, and that the life-cycle of the smaller animals, such as mice, is conveniently short. It cannot, however, replace the study of the disease in man, for the identity of carcinoma in animals with human carcinoma has yet to be proved. In view of the histological and physiological differences which exist, any conclusions drawn from comparative pathology must be applied to human carcinoma with caution and reserve. It is on this account fortunate that in this country, while the Imperial Cancer Research Fund is making a thorough comparative study of carcinoma, the Middlesex Hospital Cancer Research Laboratories, with their unrivalled clinical opportunities, are occupied chiefly with the direct study of human carcinoma.

The investigations of the Imperial Fund²⁸ indicate that cancer probably occurs, not only in all races of mankind, but in all vertebrate animals, whether domesticated or wild. No case of malignant growth has, however, been recorded in a reptile.

Mouse-Carcinoma.—Ten years ago, according to H. R. Gaylord, Morau²⁹ transplanted portions of carcinoma from mouse to mouse over a period of nearly two years. The effective pioneer of the subject was, however, Jensen, of Copenhagen³⁰, whose experiments in artificially transplanting mouse-carcinoma to other healthy mice have become classical. In 1903 Borrel, of Paris, published another series of transplantations, and in 1904 the Report of the Imperial Cancer Research Fund, embodying the work of Bashford and Murray, confirmed and extended their results. It is found that Jensen's mouse-tumour may be kept on ice for as long as eighteen days without losing its infectivity when subsequently inoculated into a healthy mouse. On the other hand, exposure to the body temperature for twenty-four hours in the dark destroys the infectivity of the tumour-tissue. Trituration of the carcinomatous tissue in a mortar, so as to destroy the cell elements, also destroys its infective power. A certain amount of stroma is necessarily inoculated along with the epithelial cells which form the essential part of the tumour; but the stroma element dies after inoculation, and the stroma of the implantation growth is formed anew from the tissues of the host. In two cases of spontaneously occurring mouse-carcinoma, Bashford has succeeded in producing secondary tumours by inoculating a part of the primary growth into

other portions of the body. In France two similar experiments were made with success on human patients by an observer who, fortunately for himself, remains anonymous !

The Proliferative Activity of the Cells of Mouse-Carcinoma.—The cells of Jensen's original mouse-tumour, transmitted through the post or otherwise to various laboratories in Europe and America, continue to grow with unabated activity after four years of continued transplantation to successive generations of mice. Bashford, in the laboratories of the Imperial Cancer Research Fund, has obtained 20,000 grams of tumour tissue from a mouse, weighing 15–20 grams, which died more than three years ago, and the tumour tissue is still proliferating in fresh mice. As Prof. D. A. Welsh says, "This great power and persistence of growth is paralleled only by the natural propagation of successive generations of mice, and indicates an enormous potential vitality in the cells of the new growth, a vitality only comparable to that which secures the continuance of the race."

Bashford has found that inoculation succeeds as well in young animals as in old ones, although, when it arises *de novo* and spontaneously, mouse-carcinoma occurs only in elderly mice.

Apolant, Ehrlich, and Haaland³¹ record the transformation of a mouse-carcinoma of adenoid type into a tumour of mixed sarcomatous and carcinomatous type, after transference of the tumour through ten generations of mice. By the fourteenth generation the tumour had become a pure spindle-celled sarcoma, and it subsequently bred true as a sarcoma up to the fortieth generation. A parallel case of adenoma of the thyroid in man, observed by Schmorl, which recurred as a mixed tumour, partly carcinomatous and partly sarcomatous, is recorded in the same paper. The metastatic deposits examined after death showed pure spindle-celled sarcoma. Two other strains of mouse-carcinoma showed sarcomatous transformation, but only after implantation through many successive generations.

These observations, if confirmed, are obviously of great importance as indicating a close relationship between carcinoma and sarcoma, but they lose much of their significance if Jensen's tumour is really an endothelioma, not a carcinoma, an opinion held by von Hansemann and by Lazarus-Barlow.

Haaland³², following up the investigations of Ehrlich, made further experiments with a mixed carcinoma and sarcoma. By heating the tumour tissue to 44° C. for a suitable period, and subsequently transplanting it into a fresh mouse, he succeeded in obliterating the carcinomatous element. A pure sarcoma developed at the seat of the inoculation. The longer the period of heating which the tumour-tissue had undergone, the slower and later in appearing was the growth derived from its implantation. More recently Haaland³³ has studied the dissemination of Ehrlich's mouse-sarcoma. He finds that, while metastases in the lymph glands are rare, systematic microscopic examination of the lungs shows malignant embolism of the pulmonary arteries in 60 per cent of cases.

Leo Loeb³⁴, in March, 1904, working in the laboratory of the University of Pennsylvania, transplanted a glandular tumour of the submaxillary gland from one Japanese mouse to another. The transplanted tumour, to his astonishment, was found to present the characters of a typical spindle-celled sarcoma. Further transplantations resulted either in (1) A pure spindle-celled sarcoma, (2) Nodules some of which were glandular, others sarcomatous, or (3) Tumours composed of mixed glandular and sarcomatous tissue. The sarcomatous element was found more widely disseminated from the point of inoculation than the glandular element. In the course of the series of inoculations the growth acquired an increased virulence, and grew much more rapidly. If the tumour tissue was subjected to a temperature of 43° to 44°, and then inoculated, the latent period before a macroscopic tumour appeared was much prolonged.

Variations in the Virulence of Mouse-Carcinoma.—By transplantation, with special precautions, through many generations of mice, Ehrlich has artificially increased the virulence of a strain of mouse-carcinoma to a very high degree. In the case of bacteria, similar methods are, as he points out, already familiar.

In H. R. Gaylord's laboratory³⁵ a tumour derived from a Brooklyn mouse gave 5 per cent of successful inoculations at first, then hovered between 5 and 10 per cent for three or four generations, then the inoculability increased rapidly until the tumour gave 100 per cent of successful inoculations. In the later inoculations the growth became so rapid that it produced in eight days a mass as large as the mouse itself.

The Artificial Production in Mice of Immunity against Carcinoma.—The earliest studies in this subject were made by Jensen. H. R. Gaylord³⁶, among 1500 mice inoculated with carcinoma in the Buffalo laboratories, noted 70 cases of spontaneous cure. His assistant, Dr. Clew, found that mice which had thus spontaneously recovered possessed a permanent immunity against subsequent inoculations.

Clowes and Baeslack³⁷, in the New York State Cancer Laboratory, have investigated the question of immunity in mice which have spontaneously recovered from inoculation. Since inoculation is apt to be followed by temporary inflammatory swelling which may be mistaken for new growth, it is necessary to adopt a standard of successful inoculation. The authors take as their standard the presence of a growing tumour at a date not less than three weeks after inoculation, reaching, at some period of its development, a volume of 20 c.mm. Thirty mice in which spontaneous recovery occurred were re-inoculated with more virulent material, ten of them twice over. In no case did a tumour develop at the seat of inoculation. On the other hand, mice in which the primary attempt at inoculation was unsuccessful, re-inoculated at the same time as the "immunized" mice, developed tumours in a certain proportion of cases. By mixing cancer materials previous to inoculation, (a) with the serum of spontaneously-recovered mice, (b) with serum from normal mice, Clowes and Baeslack found that the

serum of a spontaneously-recovered mouse exerts an inhibitory effect on the growth of the inoculated material. The percentage of tumours in the "immunized" series was much smaller, and in those cases where a tumour developed, the average period of survival was longer.

Gaylord³⁸ has found that immediate contact with blood produces atrophy of the cells of mouse-carcinoma, and takes away their power of proliferation. In the early stages of mouse-carcinoma, squeezing the tumour, or producing hæmorrhage into it, causes retrogression. In the later stages the same procedure may cause the tumour to grow rapidly. Handley³⁹ had previously shown, from a study of metastatic distribution, that in man, cancer-cells which obtain access to the blood-stream are usually reduced to impotence, and had called attention to the special frequency of spontaneous cure in deciduoma malignum, the only carcinoma certainly known to spread by the blood-stream.

During the past year the subject of immunity has been studied in the laboratories of the Imperial Fund.⁴⁰ It is found that if an animal spontaneously recovers from inoculated mouse-carcinoma, it is insusceptible to further inoculations. The protection has been found to last for at least six months, and to apply not only to inoculations with the same tumour, but also to inoculations with other tumours of allied nature. An injection of healthy blood, at a site remote from the point of subsequent inoculation of carcinoma, may confer some degree of immunity. Thus, when 25 mice which had received an injection of the blood of other healthy mice were inoculated with cancer, 25 per cent developed tumours, as compared with 68 per cent of the control animals. It has not yet been found possible to arrest the progress of experimental or sporadic mouse-carcinoma by artificial means.

In the Buffalo laboratory, according to G. N. Calkins⁴¹, over 150 spontaneous recoveries followed successful inoculations of a particular strain of mouse-carcinoma. This dying tumour was transplanted to a new strain of mice, and its virulence was at once restored. Clews found that the injected blood of mice which had spontaneously recovered, possessed the power of curing mouse-carcinoma in its early stages. Taking 44 mice, Clews inoculated 22 of them with cancer tissue plus serum from recovered mice, and 22 with cancer tissue plus normal blood derived from healthy mice. Three of the first (artificially immunized) 22 mice developed tumours, and 10 of the second (non-immunized) 22 mice.

PRECIPITINS IN CANCER⁴².

If human blood-serum is injected into a rabbit, the blood of the rabbit undergoes certain changes whereby its serum acquires the power of throwing down a precipitate when mixed with human serum. By injecting into rabbits fluids prepared from cancerous tissues, W. S. Lazarus-Barlow, H. A. Colwell, and J. J. Douglas have attempted to prepare a reagent—the altered blood of the injected animal—which, when mixed with the blood-serum or other fluids of suspected cases of

early cancer, should give a characteristic reaction. It was thought, for example, that the serum of a rabbit injected with the juice of a carcinoma might give an appreciably larger precipitate with the blood-serum of a case of early carcinoma than with the blood-serum of a healthy man. This, however, is not the case. The serum of rabbits injected with cancerous or sarcomatous human tissues gives the same "human" reaction as the serum of rabbits injected with healthy human tissues. These experiments are important as indicating how little cancer cells differ from normal cells in their chemical relationships.

CANCER AND NERVE AREAS.

G. Lenthal Cheatele⁴³ has published extended observations which, in his opinion, show that certain forms of cutaneous malignant disease, and especially rodent ulcer, tend to map out, as they spread, areas which correspond either to "Head's areas" or to the peripheral distribution of a particular nerve-trunk. More recently he has published a case of cutaneous nævus occupying a segmental nerve-area. He has not yet published any microscopic investigations on the subject, and has abstained from theorizing on his observations.

THE GASTRIC JUICE IN CANCER.

It is known that, in cases where cancer of the stomach is suspected, absence of hydrochloric acid from the gastric juice is of some value as confirming that suspicion. The subject has been investigated from a wider point of view by Prof. Moore, of Liverpool⁴⁴, with W. Alexander, R. E. Kelly, H. E. Roaf, and E. Whitley. It appears that the frequent absence or reduction in the amount of free hydrochloric acid in malignant disease is not entirely dependent on the localization of the growth in the stomach, but may occur wherever the growth is situated. The hydrochloric acid of the gastric juice is diminished in all cases of enfeebled vitality, but its reduction is much more marked and frequent in cases of cancer. With Günzburg's reaction, of 34 cases of cancer only 11 gave a positive reaction, and of these, the amount of free hydrochloric acid was above '05 per cent in 4 only, whereas of 20 non-malignant cases, hydrochloric acid was present in fifteen, and ten of these showed more than '05 per cent. The authors quoted, connect these facts with an increased alkalinity of the blood-plasma in cancer, which in their opinion favours cell-proliferation. Prof. Moore and Dr. Wilson state that increase in the alkalinity of the blood is found in an early stage of carcinoma. They refer to the increased alkalinity of the blood in old age as associated with its special liability to carcinoma.

ENDOTHELIOMA.

The form of malignant growth known as endothelioma has lately attracted much attention, but owing to the absence of satisfactory criteria for distinguishing a cell derived from endothelium from the

other cells of the body, the boundaries of the subject are ill-defined. In this country the endotheliomata have lately been studied by W. S. Lazarus-Barlow⁴⁵, whose paper on the subject is based upon re-examination of 5,000 sections of malignant growths accumulated during the past five years at the Middlesex Hospital. He finds that the normal endothelial cell is characteristically round or oval, with a large nucleus, also round or oval. The chromatin of the nucleus lies chiefly round its periphery and at its centre, so that the nucleus is remarkable for its clearness and vacuolated appearance. Endothelioma may originate either in the lymphatic or in the vascular (hæmal) endothelium. The endothelium may proliferate inwards into the space which it lines, and may fill it up with a solid mass of cells (*enthelioma*), not possessing a lumen. Such growths frequently simulate a carcinoma very closely, but differ in that the central part of an enthelioma is its most cellular portion, while the central part of a carcinoma is its most fibrous portion. For other diagnostic points the original paper may be consulted. The endothelium may proliferate outwards (*perithelioma*), and may thus give rise to central spaces, sometimes filled by coagulated fluid or débris, lined by concentrically arranged layers of proliferating endothelial cells. Perithelioma is distinguished from angiosarcoma by the actual new formation of vessels in the latter form of growth.

Lazarus-Barlow finds that endothelioma of one form or another constitutes 8 per cent of cases of malignant disease of the tongue, 10 per cent of the breast, 10 per cent of the liver and bile-passages, and 7 per cent of the malignant diseases primarily affecting bones. The group of endotheliomata must, in his opinion, be widened to include certain forms of growth formerly described as squamous or spheroidal-celled carcinomata. The best account of endotheliomata in German literature will be found in Borst's *Lehre von den Geschwülsten* (Wiesbaden, 1902).

CHONDRIFICATION OF THE STROMA IN CARCINOMA.

A. G. R. Foulerton⁴⁶ points out that a formation of hyaline cartilage may occur in the stroma of epithelial new growths of the kidney, the organ of Giralaldès, and the testicle. He records a unique case of a similar change in carcinomatous inguinal glands secondary to a growth of the lower end of the rectum, and refers to chondrification of secondary carcinomatous deposits in the lungs. He regards the change as determined by some peculiarity in the secretion of the epithelial cells of the carcinoma. He believes that many cases described as chondrosarcoma of the testicle are really columnar-celled carcinomata, the stroma of which has undergone chondrification.

G. T. Wrench⁴⁷ has investigated the relation of elastic tissue to the stroma of carcinoma, using Weigert's stain. He finds that the small-meshed intra-alveolar stroma of carcinoma, whether primary or secondary, is devoid of newly-formed elastic tissue, except in the neighbourhood of vessels and ducts. This conclusion supports the

generally accepted view that the stroma of a carcinoma is the result of a reaction of the tissues to the invading epithelium, and is not an essential part of the tumour.

PAGET'S DISEASE OF THE NIPPLE.

Ribbert⁴⁸ confirms the statement of Jacobæus that Paget's eczema is secondary in point of time to, and consequent upon, a carcinoma situated in or under the nipple. He believes that the eczema is really due to an invasion of the skin by carcinomatous cells, and that the round clear cells seen in sections of the skin, which were previously said to be cells containing parasites, etc., are in reality cells of the underlying carcinoma. Though my own unfinished investigations indicate the truth of Ribbert's main conclusion, the eczematous condition of the nipple is not, in my opinion, due to carcinomatous infiltration, but is a condition allied to pachydermia, and depends upon obstruction of the lymphatics by permeation and perilymphatic fibrosis, processes associated with the growth of the underlying carcinoma.

Statistical studies of malignant growths of the various organs of the body continue to appear in the *Archives of the Middlesex Hospital* (1906). The seventh volume contains papers on "Menstruation and Childbirth in Relation to Cancer," by Walter Ball; on "Malignant Disease of the Lip and Tongue," by Cecil Rowntree; on "Cancer of the Pharynx and Œsophagus," by T. W. Wright; on "Cancer of the Stomach," by Hector Colwell; and on "Cancer of the Uterus, Vagina, and Vulva," by Lloyd Andriezen and Archibald Leitch. It is impossible to convey the substance of these papers in the form of an abstract, but they constitute a storehouse of information on the subjects with which they deal.

HOW CANCER SPREADS.

The present writer has made a study of the mode of dissemination of breast-cancer, and the results of his work on the subject have recently been published in book form.⁴⁹ It is probable that most carcinomata disseminate mainly by permeation, though as yet proof is wanting except in the case of mammary carcinoma. This question is one of vital and practical interest in regard to operative treatment, and the further study of dissemination will probably lead to advances in the surgery of nearly every variety of cancer.

The first step towards dissemination is taken when the epithelium of the incipient carcinoma obtains access to the neighbouring lymphatic vessels. These minute channels form the line of least mechanical resistance to the pressure exerted by the proliferating cancer cells. Consequently, just as an injection fluid forced into the subcutaneous tissues spreads along the lymphatic vessels around the point of injection in all directions, so, too, the carcinoma cells push their way in a continuous line along the lymphatics—a process which I have termed *permeation*. Permeation is not appreciably helped or hindered by the

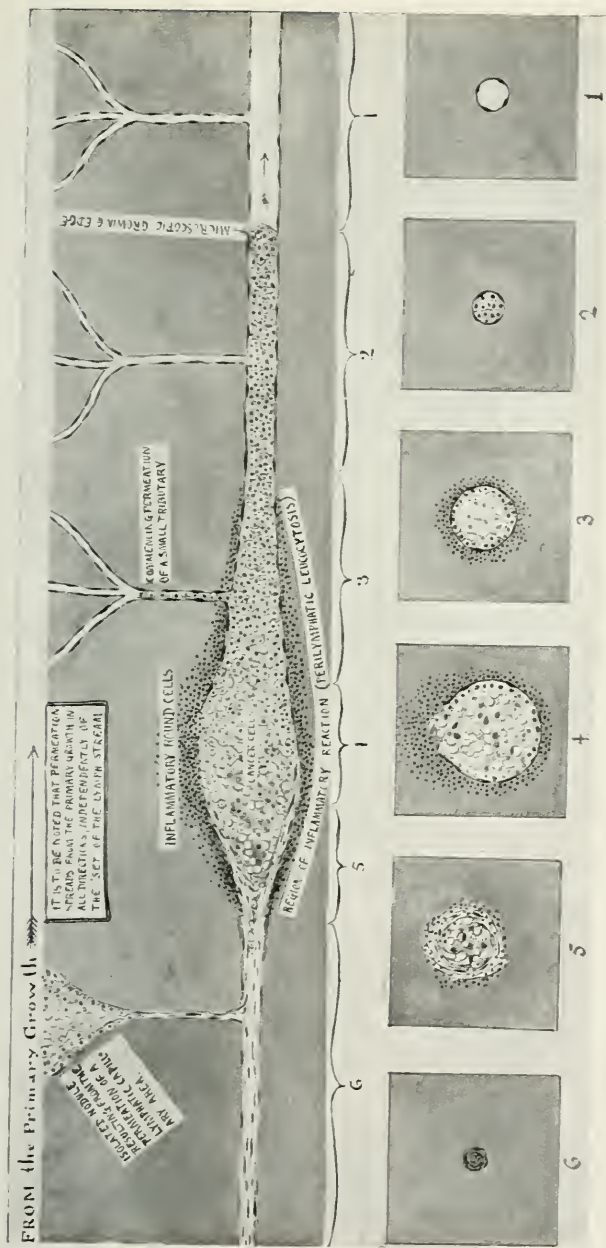
lymph current, and spreads almost as readily against the lymph-stream as with it. It will readily be understood that this process of permeation, in its centrifugal spread, extends most widely in the plane of the lymphatic plexus into which the cancerous organ drains. Here, again, the analogy with an artificial lymphatic injection holds good, but it must be clearly understood that, in cancer, the driving force which impels the injection-fluid is represented by the growth-pressure of the actively proliferating cancer cells, which push their way in continuous columns along the lymphatics.

It has always been assumed that the force of the lymph-stream is the main agent in transporting cancer cells from the primary growth to distant regions, an error due to the clinical prominence of enlargement of the lymphatic glands in carcinoma. It is true that, in nearly every case, cancer cells intrude from the lymphatic plexuses into the trunk lymphatics, and are swept by the stream to the nearest set of lymph-glands. It is also true, that when these glands are blocked by the growth of cancer in them, a reflex lymph-stream sets in towards other sets of glands, which may to a small extent carry cancer cells in a reversed direction. But the action both of the direct and the reversed lymph-stream is strictly confined to the lymphatic area in which the primary growth originates, and for that reason is impotent to produce general dissemination. If the lymph leaves the lymphatic area in question in the normal direction by way of the glands, any cancer cells it contains are filtered off by the glands. If the lymph current sets in an abnormal direction, away from the glands, it can only reach other glands by passing through the fine anastomotic plexuses which separate one lymphatic area from the next. These anastomoses, just like the glands, filter off any cancer cells which the lymph-stream may carry with it. Proof of these statements is impossible within the limits of this article.

It is a well-known fact that bacteria which cannot be forced through a porcelain filter will, nevertheless, if left within it, grow through its pores and infect its outer surface. The exactly comparable process of permeation enables cancer cells to traverse—very slowly and with difficulty—both the lymphatic glands and the anastomotic plexuses which separate one lymphatic area from the next; such an anastomosis, for example, as takes place at the middle line between the lymphatics draining into the right and into the left axillary glands. The ability of permeation to traverse lymphatic anastomoses, however fine, places the whole lymphatic system at its mercy, and constitutes it the principal agent in dissemination (*Plate II*).

Blood-embolism as a Factor in Dissemination.—Cancer cells which succeed in traversing the lymphatic glands are ultimately discharged into the blood-stream. The remote metastases of carcinoma have been erroneously ascribed to the embolic arrest of these errant particles in the smaller blood-vessels. A considerable body of evidence exists, however, to prove that the blood is a most unfavourable medium for the nourishment of epithelium, and that as a rule the blood destroys

SCHEME TO ILLUSTRATE THE GROWTH OF CANCER CELLS ALONG A SMALL LYMPHATIC (PERMEATION).



The advance of permeation is seen in the upper figure in longitudinal section, and in the lower figures as a series of transverse sections. The lymphatic is finally destroyed by perilymphatic fibrosis. 1. Normal lymphatic, shortly to be invaded by the advance of permeation along it. 2. Lymphatic permeated by cancer cells, but not yet disintegrated. Note the absence of inflammatory reaction in this region. 3. The lymphatic disintegrated by the growing cancer cells. 4. The lymphatic ruptured by the growing cancer cells, an event followed by vigorous inflammatory reaction. 5. The mass of degenerate cancer cells enclosed in a false capsule of newly formed fibrous tissue. 6. The cancer cells are finally strangled by contraction of their fibrous capsule. The original lymphatic is now represented simply by a thread of fibrous tissue, the cancer cells having been destroyed.

From *Cancer of the Breast, and its Operative Treatment*, by W. SAMUEL HANDELY (JOHN MURRAY, 1906).

or inhibits the activity of the cancer cells which undoubtedly obtain access to it. The embolic theory of dissemination, as applied to carcinoma, is only true for exceptional cases.

Perilymphatic Fibrosis.—The process of permeation is evidently capable of recognition by the ordinary methods of histology. How then, it may be asked, has its importance so long eluded notice? The answer is that permeation is a fugitive process, that a permeated lymphatic, when it becomes distended by the continued proliferation of the contained cylinder of cancer cells, acts as a foreign body and excites an inflammatory reaction. As the result of this reaction, the contained cancer cells are strangled and destroyed. The original lymphatic is finally replaced by a slender thread of fibrous tissue. It follows, that examination of the tissues in the immediate neighbourhood of the primary growth, unless the case be an early one, will fail to disclose the presence of permeated lymphatics. Here and there, where the protective process of fibrosis has failed, isolated nodular metastases will be seen, but in this region the evidence of the mode of spread has been obliterated. If, however, the examination is pushed further afield, into the region of apparently healthy tissue which lies beyond the visible secondary nodules, a *microscopic growing edge* will be found, where the vessels of the principal lymphatic plexus of the part (in the case of breast-cancer the fascial lymphatic plexus) are filled by cylinders of actively proliferating cancer cells, while the surrounding tissues are entirely free. Cancer, in fact, is a serpiginous disease which spreads, like a tertiary syphilide, in an ever-widening circle, within the boundaries of which healing processes are taking place. These healing processes follow up the spreading edge of permeation, but seldom or never succeed in overtaking it.

Visceral Dissemination.—From its very nature, permeation is a very slow process. In certain cases of breast-cancer, for instance, permeation may give rise to a crop of subcutaneous cancerous nodules which spread gradually in all directions from the breast, until, after several years, they cover the whole body except the distal halves of the limbs. If, however, permeation carries cancer-cells through the lymphatic anastomoses to the subserous lymphatic plexuses, a process which in breast-cancer I have shown to take place with especial frequency just below the ensiform cartilage, the case often goes downhill with extraordinary rapidity, owing to the escape of cancer cells into the peritoneal cavity, and to the implantation of these escaped cells upon the serous surfaces of the viscera. This process of *trans-cælotomic implantation* must be regarded as the main agent in visceral dissemination. Owing to the action of gravity, secondary deposits produced in this way are found with especial frequency in the pelvis, more particularly in the ovaries.

Natural Regressive or Curative Processes in Carcinoma.—My investigations on breast-cancer have shown that, at any rate in this variety of carcinoma, *the progress of the disease is normally accompanied by regressive or curative processes.* This fact explains much that is

mysterious and baffling in the natural history of carcinoma. The series of microscopic changes which lead to the complete fibrosis of a permeated lymphatic (*vide supra*) find a close parallel in the occasional disappearance of a primary growth, or of large secondary nodules. The only difference is one of scale. As we have seen, perilymphatic fibrosis is abortive as a curative agent, because it does not affect the lymphatics at the "microscopic growing edge." For the same reason, fibrotic and regressive changes occurring in macroscopic aggregations of cancer cells, though they appear to hold out the promise of cure, are nearly always found to be accompanied by the progress of the growth at other points further removed from the primary focus. It cannot be too strongly insisted upon that the battle against carcinoma must be won or lost, not in the region of metastases, visible to the naked eye, but at the invisible "microscopic growing edge" of permeated lymphatics. These facts explain the early promise, and the ultimate failure, of cancer remedies.

Fibrosis of the Primary Growth.—In illustration of the foregoing statements, we may consider a phenomenon which may in some cases occur naturally, while in other cases it follows the application of a remedial agent so closely that the relation of cause and effect seems obvious. This phenomenon is the complete shrinkage and disappearance of the primary growth. An ulcerated cancer of the breast may, without any treatment, contract and diminish in size until it is represented only by a fibrous thickening, over which the epithelium spreads until the ulcer is entirely healed. An ulcerated cancer of the cervix may, either naturally, or under the action of X rays, or subsequently to the application of high-frequency electricity, similarly shrink and begin to heal over, while at the same time the pelvic induration diminishes to a marked extent. These examples are taken from my own experience. Such cases have frequently been recorded as "cures." But in every instance within my own observation, the disease has, nevertheless, progressed to a fatal issue. At the very time when the primary growth is shrinking and healing over, the unarrested spread of permeation at the "microscopic growing edge" is carrying the cancer further and further from its seat of origin, until invasion of the vital organs brings the case to a rapid termination.

TREATMENT.

Until the natural history of cancer—the course of untreated cases—has been more fully studied, it will remain impossible to estimate the precise value of cancer remedies. But this much is certain, that whatever the treatment employed, a certain percentage of cases of cancer will exhibit, as a part of the natural course of the disease, temporary fluctuations and local attempts at cure. These phenomena depend upon the nature of the process of dissemination. Moreover, it is probable that all massive aggregations of cancer cells visible to the naked eye are in a somewhat degenerate and devitalized condition, owing to their nutritional difficulties. Consequently, any

shock to the bodily economy, whether it be a physiological crisis, such as the natural or artificial menopause, or the administration of a drug or poison, or the application of X rays, is likely to be felt with especial force by the primary growth and its massive secondary deposits, and to lead to temporary shrinkage or even to the disappearance of these tumour-masses.

But the vital power of a cancer appears to reside principally in its "microscopic growing edge" of permeated lymphatics which lies beyond the visible massive deposits. Here the tumour cells are healthy and well nourished, and for that reason capable of strong resistance to unfavourable influences. And though the flabby vitality of the macroscopic deposits may be upset by therapeutic measures, and a complete cure may appear to be at hand, the microscopic growing edge of permeated lymphatics continues to advance, and a fresh crop of metastases produced from it kills the patient.

Surgical treatment still offers the best chance to the patient with cancer. In my opinion, further researches into the process of dissemination, on lines already marked out, could not fail to improve the results of surgical treatment in every form of malignant disease. It appears that such researches might with advantage employ some of the energy now devoted to a frontal attack on the ultimate problems of cancer.

X Rays in the Treatment of Cancer.—Save in cases of rodent ulcer, the application of X rays to the treatment of cancer has given very disappointing results. There seems to be evidence that superficial and early epitheliomata have occasionally been cured by X rays, but few surgeons, in this country at any rate, would care to advise their use for any operable case of cancer. Moreover, at least three cases of epithelioma *produced* by X rays have within recent years occurred among X ray workers in London alone. This fact, while it does not in itself negative the value of X rays for cancer, shows, at any rate, that they must be employed with great caution, and in moderate dose only. The continued application of X rays may be harmful by depressing or destroying the vitality of the inflammatory round cells, which, according to the writer's researches, play a very important part in the scheme of natural defence against carcinoma. X rays may be tried, though without any sanguine anticipations, for superficial inoperable growths. In limited doses, as a prophylactic against recurrence after operation, their employment in the future is likely to be extended.

C. R. Lyster⁵⁰, as the result of his wide experience in the use of X rays for cancer at the Middlesex Hospital, reached the following conclusions:—

1. Treatment of malignant growths by X rays is only local; it does not in any way affect the growth of secondary deposits in parts of the body other than that under exposure.

2. Without injury to the skin it is impossible to administer a sufficiently strong exposure to modify growth in the viscera. So far as concerns disease situated in the deeper viscera, X rays are not

applicable as used at present, except in cases where there is distinct relief of pain. An innocuous exposure will, however, frequently cause relief of deep-seated pain.

3. In the cases where the disease is superficial, treatment by X rays almost always relieves pain, retards growth, produces retrogressive changes, and enables many patients to resume their ordinary life.

W. B. Coley⁵¹ records 40 cases of cancer of the breast treated by X rays under his personal observation. In one of these cases the cancer "disappeared," in the other 39 cases the growth promptly recurred. He stated that not a single cure occurred under the application of X rays among 130 cases of deep-seated cancer at Harvard, and that the experience of Mikulicz was equally unfavourable.

The Treatment of Inoperable Malignant Disease by Coley's Fluid.—A very important and encouraging paper by W. B. Coley⁵² summarizes thirteen years' experience of his method of treating malignant disease by the injection of bacterial toxins. A close perusal of this paper leaves no doubt as to the therapeutic value of Coley's fluid in certain cases of sarcoma, and even if the proportion of successes to failures is small, the method should be given a fair trial in all cases of inoperable sarcoma.

The starting-point of Coley's work was a case in which an accidental attack of erysipelas in a patient with inoperable round-celled sarcoma of the neck was followed by spontaneous disappearance of the tumour. Coley followed up this patient, and found him well seven years later. He then, without knowing of Fehleisen's work, produced artificial erysipelas in a patient with inoperable spindle-celled sarcoma of the tonsil. This case, with nine subsequent ones, forms Coley's first series. Of these 10 cases, 4 were carcinoma and 6 sarcoma. Erysipelas could not be produced in any of the four carcinoma cases, but slight local improvement was noticed while the patient was receiving the inoculations. After repeated attempts, erysipelas was successfully inoculated in 4 of the 6 sarcoma cases, with the following results:—

CASE I.—Inoperable spindle-celled sarcoma of the tonsil, with a mass of secondary cervical glands. The large tumour in the neck broke down on the second day, and discharged caseous material for ten days. The outlying nodules disappeared without breaking down. The patient remained well for eight years, and then succumbed to a local recurrence.

CASE II.—Inoperable mixed-celled sarcoma of the back and groin. After repeated failures, erysipelas was induced by injections of living cultures of the streptococcus. The tumour began to shrink on the first day; on the second day a sinus formed, with free discharge of caseous tissue. At the end of three weeks the tumour had entirely disappeared. Three months later a local recurrence took place, which yielded to a second artificially-produced attack of erysipelas. During the following three months three further spontaneous attacks of erysipelas occurred. The patient appeared to recover completely under injections of the mixed toxins which were subsequently

administered, but died three and a half years later from secondary growths in the liver and abdomen.

Coley does not expressly record the result in Cases III. and IV., but it would appear that they died of erysipelas. The remaining two cases of sarcoma, in which erysipelas could not be induced, showed only slight temporary improvement.

Owing to the difficulty and danger of producing artificial erysipelas, Coley abandoned the method, and from 1893 onwards he has injected sterilized unfiltered cultures of the streptococcus of erysipelas mixed with *Bacillus prodigiosus* (Coley's fluid). Coley, who is an upholder of the parasitic theory of cancer, believes that the toxins in some way act upon the blood-serum so as to reinforce its normal power of inhibiting the proliferation of the tumour cells. In some cases the effect is sufficient to destroy the tumour, but in the majority the balance of power still remains on the side of the tumour, which continues to grow unchecked. Coley insists on the importance of preparing the toxins from a virulent strain of bacilli, and recommends Parke, Davis & Co.'s preparation as reliable.

Preparation of Coley's Fluid.—The following directions for the preparation of the mixed toxins of the streptococcus of erysipelas and *Bacillus prodigiosus*, are according to the formula of Dr. B. H. Buxton :—

Broth: One pound of minced beef soaked over night in 1,000 cc. of tap-water ; then boiled for one hour, filtered through flannel. Add, peptone (Witte's), 10 grams ; NaCl, 5 grains. Test reaction to litmus, and render alkaline by addition of sufficient quantity of 10 per cent NaOH. Boil for one hour. Sterilize by boiling half an hour on three successive days ; 25 cc. of broth, in a small flask, is sown with streptococcus from culture in broth (a few cc. of such culture being used). Allowed to grow in the incubator for three weeks. Then sown with *Bacillus prodigiosus* (agar or broth culture), and allowed to grow at room temperature in the daylight (not direct sun) for ten days more. Poured in sterile bottles, heated to 60° in water bath for one hour ; 4 to 5 cc. of glycerin and a small lump of thymol added. Kept in ice until used.

Mode of Action of Coley's Fluid.—The effects are not confined to the region surrounding the point of injection, but the best and quickest results are obtained by injections into the tumour itself. The changes induced in the tumour tissue consist of coagulation necrosis, accompanied by local leucocytosis. The tumour tissue may be absorbed, or may be discharged as caseous material.

Dosage and Mode of Administration.—The following rules for the administration of Coley's fluid are the result of his thirteen years' experience in its use :—

" 1. Always begin with a minimum dose, for the reason that individual susceptibility varies much, and the vascularity of tumours varies more. The more highly vascular the tumour, the more severe the reaction.

"2. For local injections, the dose should be much smaller than for interstitial injections remote from the tumour. The initial dose for local injections (into the tumour) should be $\frac{1}{4}$ to $\frac{1}{2}$ minim; for interstitial injections (remote from the tumour) 1 minim.

"3. The dose should be gradually increased until a chill occurs ($1\frac{1}{2}$ to 2 hours after injection), followed by a temperature of 101° to 103° or 104° F.

"4. If there is much depression following the reaction, and the patient's general condition is not very good, it is wiser to give the injections every other day, but if the patient can bear daily injections, the chances of success are much greater.

"5. In cases in which the tumour is situated in some region where injections are difficult or dangerous, e.g., within the abdomen or pelvis, it is better to give systemic injections, into the thighs, buttocks, or abdominal wall.

"6. If the tumour becomes soft and fluctuating, it is better to open the softened areas, establish drainage, and treat with moist antiseptics.

"7. A good tonic, preferably strychnine, quinine, and iron, should be given during the treatment, and careful attention should be paid to keeping the bowels free.

"8. *Duration of Treatment.*—In successful cases a marked improvement is usually noted within one to four weeks. If no improvement is shown at the end of four weeks of vigorous treatment, the chances are that none will occur, and little is to be hoped for, more than a retardation of growth, and it may be wise to abandon the treatment or lessen the dose to the point of not making the patient uncomfortable by reason of chills. If, however, there is decided improvement, the injections should be continued until the tumour has totally or nearly disappeared. In some cases the treatment has been continued in small doses more than a year, and the patients are now well, many years after the cessation of treatment.

"9. *Technique of Administration.*—The toxins should be kept in a cool, dark place. The average duration of the treatment in the successful cases has been about two or three months, and the toxins seem to retain their strength for at least a year. Any good hypodermic syringe will answer, preferably one in which one minim can be accurately estimated on the piston-rod rather than on the barrel of the syringe. I sterilize the needle by an alcohol flame, and pass boiling water through the syringe before and after using. In doses less than one minim, the toxins can be diluted with boiled water; in doses larger than one minim, no dilution is needed. The skin over the area into which the injection is to be made should be carefully cleansed with alcohol.

"10. In cases after primary operation, in which the toxins are given as a prophylactic against possible recurrence, smaller doses may be given, and it is not advisable to push them to the point of producing a chill: a slight rise of temperature, headache, and malaise are sufficient.

"That the long-continued use of the toxins is not productive of harm, is proved by several cases in my own experience:

"One patient with a twice recurrent, very rapidly growing carcinoma of the breast and axilla was given the toxins for two and one-half years. The tumour disappeared, and the patient gained ten pounds in weight, and remained well for over two years, when she developed general carcinosis with extensive abdominal involvement, and died in a few months.

"In another case, an eight times recurrent sarcoma (spindle-celled) of the chest wall (soft parts), the toxins were administered with occasional intervals of rest for nearly four years. The patient, a well-known physician, has had no treatment for over seven years, and has been able to attend to his large practice the entire time.

"*Indications for the Use of the Toxins.*—While the curative action of the toxins varies greatly in different varieties of sarcoma, being most marked in spindle-celled, and least of all in melanotic sarcoma, I believe the toxins should be tried in practically every case of inoperable sarcoma, with the possible exception of cases with extensive generalization, and of melanotic sarcoma, with which I have had no permanent success; but there are cases of this type of sarcoma that have been cured by accidental erysipelas, and cases which remained well four years or more under the mixed toxin treatment. I believe a trial worth while in such cases."

Prophylactic use of Coley's fluid after Operations for Carcinoma and Sarcoma.—Coley recommends the use of his fluid after operation as a prophylactic against recurrence. He believes that even in carcinoma it exercises an inhibitory action, but the histories of the eleven cases of sarcoma and carcinoma in which he has used prophylactic injections appear to offer the slenderest basis for this belief, especially when the natural vagaries of malignant disease are borne in mind.

Results of Coley's Cases.—Coley records 36 cases as successful under his personal treatment, but does not state how many unsuccessful cases he has had. All of the successful cases except one were sarcomata, and all were already inoperable at the time the treatment was commenced. Of these cases, 13 were round-celled sarcoma, 16 spindle-celled sarcoma, 2 mixed-celled sarcoma, 1 epithelioma, 1 chondro-sarcoma; in 3 no microscopical examination was made, but the clinical appearance, together with the history of recurrence, left practically no room for doubt as to the diagnosis.

The results in these cases, thus far, have been as follows: 5 well less than a year, 4 well from 1 to 2 years, 3 well from 2 to 3 years, 5 well from 3 to 5 years, 21 well from 5 to 13 years (10 cases well over 10 years). In 5 cases a recurrence took place, and finally proved fatal. In one of these recurrent cases the patient had remained well 8 years; in one, 3½ years; in one, 2½ years; in one, 7 months; in one, six months.

Coley has collected 60 cases treated with some degree of success by other surgeons. Of these, 22 were sarcoma of the round-celled variety, 14 spindle-celled, 3 mixed-celled, 3 endothelioma, 2 epithelioma, and in 16 no microscopical examination was made, or it was not recorded,

but in all of these cases the clinical diagnosis was confirmed by a number of surgeons, and the patients were considered hopeless from an operative standpoint.

The results in these cases were as follows: 27 patients were alive and well from 3 to 12 years, 12 remained well less than a year; in 6 the tumour disappeared, and the patient was alive and well from 1 to 2 years; in 9 the tumour disappeared, and the patient was alive and well from 2 to 3 years; in 12 the tumour disappeared, and the patient was alive and well from 3 to 5 years; in 10 the tumour disappeared, and the patient was alive and well from 5 to 12 years; 5 cases recurred within periods of from 6 months to 2 years; 2 died during treatment.

Coley has collected 12 cases in which the use of the toxins for sarcoma of bones of the extremities has rendered amputation unnecessary. Eight of these cases were free from recurrence 3 to 6 years later. Coley believes that, in nearly all cases of sarcoma of the extremities, the toxins should be tried before amputation is resorted to, a view which at present should, I think, be regarded as somewhat bold, though some of the cases recorded, especially one of myeloid sarcoma of the femur, are entirely convincing.

The accompanying photographs are from cases treated with Coley's fluid. *Plate III, Figs. A and B*, and *Plate IV, Fig. C*, illustrate a recurrent round-celled angiosarcoma, which disappeared under treatment—the patient remained well for eight years, and then died as the result of an accident. At the necropsy no recurrence was found. *Plate IV, Figs. D and E*, is a case of sarcoma of the parotid, which also disappeared under treatment, but the patient died 8 years later of recurrence.

Doyen's Serum.—From January 20, 1904, until his book went to press at the end of September, 1904, M. Doyen⁵³ treated 116 cases of cancer, 20 of which he considered cured (!) on September 30, 1904. The series also included 49 bad cases, 16 of whom were known to be dead at the time of writing. Several cases died accidentally when their cure appeared complete, but no necropsy is recorded.

Leaving these more recent cases, attention may be confined to the 21 cases, "*pouvant être considérés guéris*," among Doyen's first series of 126 cases. In 14 of these cases the report terminates, "*30 Septembre, 1904, État assez (or très) satisfaisant.*" This laconic and somewhat ambiguous note is separated from the immediately preceding detailed note of the patient's condition shortly after operation by intervals of from nine months to three years. None of Doyen's "cures" can be accepted as such by the most lenient critic.

Doyen and Delbet⁵⁴ reported to the Société de Chirurgie 26 cases of cancer treated by Doyen's serum. Most of the cases were growths of the breast. One case remained without recurrence, 2 were stationary, 20 grew rapidly worse, and 3 were lost sight of.

A. Paine and D. J. Morgan⁵⁵ have tried Doyen's serum in 9 cases of carcinoma or epithelioma at the Cancer Hospital, Brompton. In

PLATE III.

ANGIOSARCOMA TREATED BY COLEY'S FLUID.

SHOWING THREE STAGES IN THE PROGRESS OF THE CASE.



Fig. A.

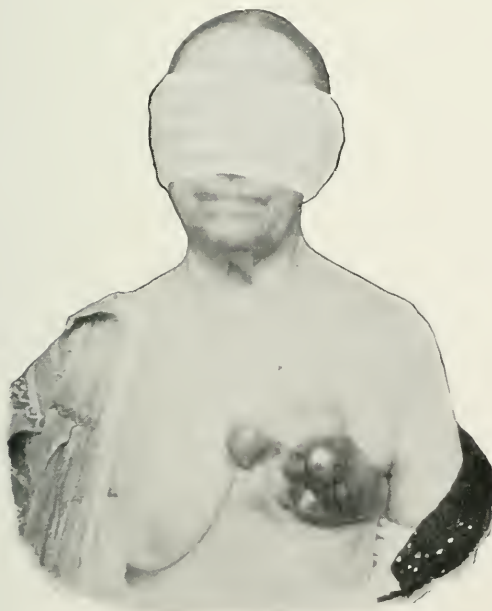


Fig. B.

no case did benefit result other than temporary relief of pain (2 cases). In 7, the growth continued to enlarge during the treatment, while in the other 2 it remained stationary. In 2 cases of breast-cancer severe pain was produced by the injections. In 3, alarming cardiac failure and collapse resulted from the injections.

E. S. Pattison⁵⁶ has recorded 4 cases treated by Doyen's serum without definite improvement.

Vaccine Treatment with the Micrococcus Neoformans.—Jacobs and Geets⁵⁷ have found that Doyen's serum is not only clinically inactive, but that it is devoid of all bactericidal, bacteriolytic, agglutinative, or opsonic power when tested against the organism (*Micrococcus neoformans*) used in its preparation. Instead of using Doyen's serum, they have applied the methods of Sir A. E. Wright, and have used a vaccine, consisting of measured doses of killed cultures of the *Micrococcus neoformans*. Their work, and that of Sir A. E. Wright and Scanes Spicer⁵⁸ in the same direction, is so recent that no opinion can be expressed as to its value. The Belgian Royal Academy of Medicine found the evidence adduced by Jacobs and Geets to be scanty and unconvincing, and 2 of the 5 cases treated by Wright and Spicer had already died when their communication was made.

Treatment by Drugs.—Up to the present the pharmacological substances used for the cure of cancer have emerged into short-lived prominence, only to disappear in the limbo of the forgotten, or to fall into the hands of the quack. But, prior to the discovery of mercury, this statement might with equal truth have been made concerning remedies for syphilis. It is equally unscientific to deny, or to affirm, the value of an untried remedy, and it is therefore necessary to give some account of the more recent attempts to cure cancer on medicinal lines, and to recognize that in inoperable cases the use of a "remedy" for cancer only ceases to be legitimate practice when trial has proved it useless.

Wm. Gordon⁵⁹ has given an extended trial to the use of **Violet Leaves**, and recommends the method as harmless and possibly useful. The method he employed is as follows: About fifty good-sized, freshly-picked, garden-grown violet leaves, with their stalks, are put in a jug, and a pint of boiling water is poured on them. The jug is set aside in a cool place for twelve hours, say overnight, and then the green liquid is strained off. Half of this liquid is taken internally, either at once, or in divided doses, during the day. The other half is used to make fomentations or other local applications adapted to the seat of the cancer. This must be done daily as a regular routine for months. Local treatment of the growth by fomentations or poultices of the leaves is used simultaneously in breast-cancer. In mouth-cancer the infusion is used as a gargle, in rectal and uterine cases as an injection. Overdosage of the infusion may lead to anorexia, diarrhœa, temporary increase of pain, rash, shortness of breath, and faintness. Gordon fully describes 4 cases treated by him. In the first 2 of these, no microscopical examination was made, but in the second of these cases,

diagnosed as a growth of the cervix, the clinical evidence was very strong. The vaginal growth cicatrized, and the pelvic induration disappeared. The case remains well twenty-eight months after the onset of the symptoms, a period too short to be conclusive as to cure. In the third case, temporary reduction in the size of a cancer of the tongue was noted under the use of violet leaves. In the fourth case, an advanced growth of the tongue and the floor of the mouth, sloughing of the growth followed violet-leaf treatment, but the advance of the growth was not arrested.

In 1903 the treatment by violet leaves was employed in the Middlesex Hospital cancer wards without beneficial result. Again, in 1905, twelve patients were treated by administration and outward application of infusion of violet leaves. In no case was any improvement noted following the treatment⁶⁰. The question of the value of violet leaves in cancer may still be regarded as *sub judice*, but with a very strong presumption on the negative side.

Following the theories and investigations of Beard, of Edinburgh, J. A. Shaw-Mackenzie⁶¹ recommends the treatment of inoperable cancer by "preparations of the pancreas, bile salts, and intestinal gland extracts and ferments, alone or combined." He points out that cancer of the stomach stops abruptly at the pylorus, that the small intestine is rarely the seat of cancer, and that cancer of the large intestine and rectum for the most part increases in frequency the further the distance from the duodenum. The treatment must be regarded as experimental and empirical. Its results are impartially recorded by Shaw-Mackenzie in his book on the subject. Temporary benefit, such as has been previously recorded by Shaw-Mackenzie from the injection of soap-solution and Chian turpentine⁶², has in some cases been obtained.

Beard advises that the treatment should be oral, local, and subcutaneous, and that the effect of the trypsin in breaking down the tumour should be controlled and corrected by injections of amyllopsin. He believes that the toxic symptoms which sometimes result from trypsin injections may thus be avoided. His methods are at present being tested in the wards of the Middlesex Hospital and elsewhere. (See also BREAST, CANCER OF LOWER LIP, PENIS, TONGUE, CARCINOMA OF OVARY, RECTUM, UTERUS, RADIOTHERAPEUTICS.)

REFERENCES.—¹*Brit. Med. Jour.* July 7, 1906; ²*Third Report of the Croft Cancer Commission of the Harvard Medical School*, 1905, p. 79; ³*Bradshaw Lecture, Lancet*, Dec. 16, 1905; ⁴*Lancet*, Mar. 24, 1906; ⁵*Scot. Med. and Surg. Jour.* June, 1906; ⁶*Loc. cit.*; ⁷*Med. Press*, May 16, 1906 (Translation); ⁸*Trans. Roy. Med. Chir. Soc.* 1906, p. 727; ⁹*Proc. Roy. Soc.* vol. lxxii. Dec. 8, 1903; ¹⁰*Trans. Path. Soc.* vol. lv, p. 449, 1904; ¹¹*Reports of the Imperial Cancer Research Fund*, No. 1, p. 18; ¹²*Arch. Middlesex Hosp.* 1906, vol. vii; ¹³*Brit. Med. Jour.* July 28, 1906; ¹⁴*Trans. Path. Soc.* 1905, vol. lvi, p. 372; ¹⁵*Third Report of the Croft Cancer Commission of the Harvard Medical School*, 1905; ¹⁶*Med. Rec.* Oct. 28, 1905; ¹⁷*Med. Press*, May 28, 1906; ¹⁸*Tumours Innocent and Malignant*, Cassell & Co.; ¹⁹*Arch. f. klin. Chir.* Bd. 78, Hft. 2, in *Med. Press*, May 16, 1906; ²⁰*Arch. Middlesex Hosp.* vol. v; ²¹*Proc. Roy. Soc.* vol. lvi, quoted in No. 2, part ii of the *Reports of the Imperial Cancer*

PLATE IV.

ANGIOSARCOMA TREATED BY COLEY'S FLUID.

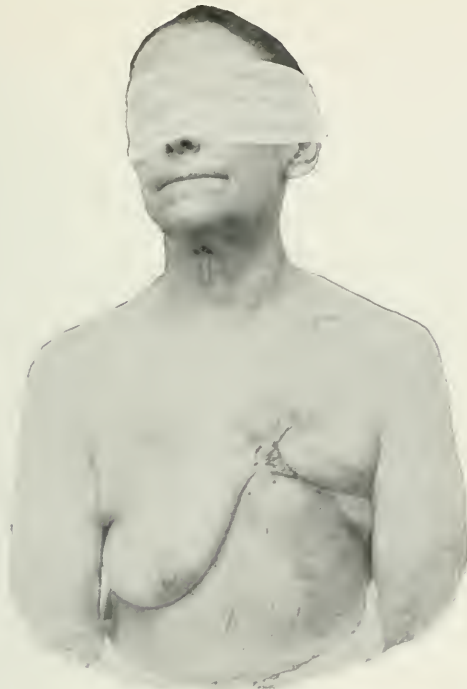


Fig. C.

SARCOMA OF PAROTID TREATED BY COLEY'S FLUID.



Fig. D.

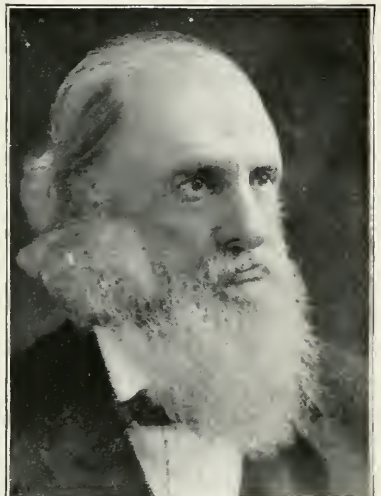


Fig. E.

Research Fund; ²²*Zeits. f. Krebsforschung*, in *Amer. Jour. Med. Sci.* Jan. 1906; ²³*Zeits. f. Krebsforschung*, Bd. 1, Hft. 2, 1904, in *Med. Rec.* Nov. 4, 1905; ²⁴*Amer. Jour. Med. Sci.* Jan. 1906; ²⁵*Ibid.*; ²⁶Blue-book on *Cancer in the Colonies*, 1906, quoted in *Brit. Med. Jour.* April 7, 1906; ²⁷*Scientific Reports of the Imperial Cancer Research Fund*, No. 2, Part i, 1905; ²⁸*Brit. Med. Jour.* Dec. 9, 1905; ²⁹*Arch. de Méd. Expérimentale*, 1904; ³⁰"*Experimentelle Untersuchungen über Krebs bei Mäusen*," *Centr. f. Bakt.* 1903, p. 28; ³¹*Berl. klin. Woch.* Jan. 8, 1906; ³²*Ibid.*; ³³*Ibid.* Aug. 20, 1906; ³⁴*Ibid.* June 11, 1906; ³⁵*Med. Rec.* Aug. 4, 1906; ³⁶*Ibid.* Oct. 28, 1905; ³⁷*Med. News*, Nov. 18, 1905; ³⁸*Med. Rec.* Oct. 28, 1906; ³⁹*Hunterian Lectures, Lancet*, Mar. 8, 15, 22, 1905; ⁴⁰*Brit. Med. Jour.* July 28, 1906; ⁴¹*Ann. Surg.* Nov. 1905; ⁴²*Arch. Middlesex Hosp.* vols. v and vii; ⁴³For refs. see *Brit. Med. Jour.* Aug. 18, 1906; ⁴⁴*Ibid.* July 28, 1906; ⁴⁵*Arch. Middlesex Hosp.* vol. vii. p. 79; ⁴⁶*Lancet*, Dec. 23, 1905; ⁴⁷*Arch. Middlesex Hosp.* vol. v; ⁴⁸*Deut. med. Woch.* 1905, p. 218; ⁴⁹*Cancer of the Breast and its Operative Treatment*, W. Sampson Handley, 1906, John Murray; ⁵⁰*Arch. Middlesex Hosp.* vol. v; ⁵¹*Med. Rec.* Oct. 28, 1905; ⁵²*Amer. Jour. Med. Sci.* Mar. 1906; ⁵³*Etiologie et Traitement du Cancer*, Doyen, Paris, 1904; ⁵⁴*Rev. de Chir.* No. 9, in *Ther. Gaz.* Dec. 15, 1905; ⁵⁵*Trans. Roy. Med. Chir. Soc.* 1906, p. 707; ⁵⁶*Brit. Med. Jour.* Mar. 31, 1906; ⁵⁷For refs. see *Ibid.* July 14, 1906; ⁵⁸*Jour. Laryng. Rhinol. and Otol.* June, 1906; ⁵⁹*Trans. Roy. Med. Chir. Soc.* 1906, p. 355; ⁶⁰Walter Ball, "*Therapeutic Measures used in the Treatment of Carcinoma*," *Arch. Middlesex Hosp.* vol. vii. 1906; ⁶¹*Brit. Med. Jour.* Mar. 24, 1906, see also *Ibid.* Jan. 27, 1906; ⁶²*Med. Ann.* 1906, p. 153.

CANCER OF LOWER LIP.

Priestley Leech, M.D., F.R.C.S.

That the glands ought to be removed in every case where an operation is done for cancer has become a truism, but exact details of such operations have not always reached the text-books. J. Hutchinson, junr.¹ describes the following technique for the removal of the glands under the jaw in epithelioma of the lower lip: A curved incision is made through skin, platysma, and fascia, which starts at one angle, extends down to the hyoid bone, and finishes at the symphysis. The facial vein is isolated and ligatured at the lower and posterior angle of the submaxillary gland. The facial artery, entering the gland from higher up from beneath the digastric, is then sought for, secured between two ligatures, and divided. The submaxillary gland is then lifted up, with the numerous lymphatic glands at its upper border, and separated from the lower jaw, the facial artery and vein being again ligatured as they cross the latter. The gustatory nerve is isolated, and its branches to the gland divided; Wharton's duct is ligatured and cut across. Thus the whole glandular contents of the submaxillary triangle can be drawn forwards towards the middle line, leaving both bellies of the digastric, the mylohyoid, and part of the hyoglossus bared by the dissection. The patient's head is turned to the opposite side, and a similar incision made from the symphysis to the hyoid bone and the angle of the jaw. By reflecting the skin at the middle line, the space between the two anterior bellies of the digastric can be completely cleared, from the symphysis down to the hyoid bone. In this way the glands, from one angle of the jaw to the other, can be removed in one piece. The glands at the angle of the jaw and down to the bifurcation of the carotid should be removed. The lip cancer is now excised in

the usual way. Drainage tubes should be inserted at each side of the submaxillary wounds, and the dressings should be protected from soiling from the mouth by placing a macintosh sheet over them. The X rays and radium are quite powerless over glandular deposits of squamous epithelioma.

Lenthal Cheatele² regards the V-shaped incisions for removal of cancer of the lower lip as more favourable to recurrence. Cancer in this situation almost invariably spreads underneath the mucous membrane of the lip, and spreads very early into the buccinator, orbicularis oris, depressor menti, and the depressor anguli oris. The position at which the so-called recurrence of cancer of the lip appears is beneath the skin somewhere between the chin and the lip, generally nearer the lip than the chin. Thus a V-shaped incision either cuts

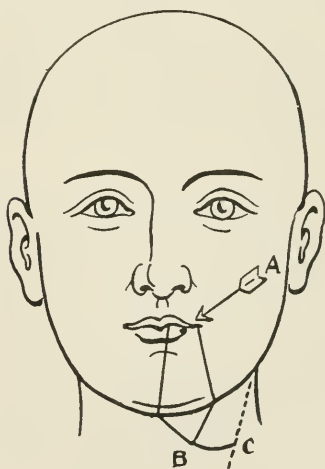


Fig. 13.

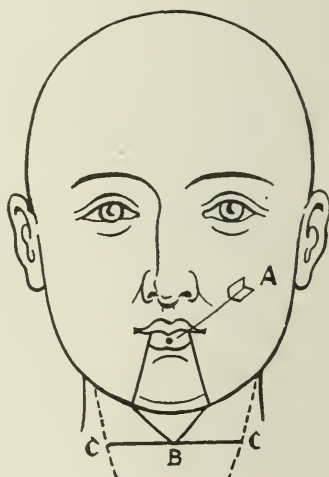


Fig. 14.

CHEATELE'S OPERATION FOR CANCER OF THE LOWER LIP.

A.—Squamous epithelioma. B.—Point midway between lower margin of inferior maxilla.
C.—Anterior border of sternomastoid muscle.

across the cancer or leaves some behind. During the last four years he has seen four cases of this so-called recurrence, three of which were practically inoperable.

The successful results of operative interference in cancer depend chiefly upon the knowledge and skill displayed by the operator at the first operation. In all cases of cancer of the tongue and lip, in fact wherever there is malignant ulceration, he cauterizes the surface with a suitable cautery at a dull red heat until it is of a leathery consistence. The parts that are being removed should be regarded as a sponge full of cancer, out of which the cells can be squeezed, so during the operation great care is taken not to squeeze the parts, and the ulcer is not allowed to touch the parts from which it is being removed; these precautions

are carried out with the object of preventing transplantation. As will be seen from *Figs. 13 and 14*, the incisions he makes are diverging and not converging. The lymphatic glands are removed at the same time, or at a second operation, whether they can be felt to be enlarged or not. The advantage of operating in two stages is the avoidance of infecting the triangles of the neck from the lip or the ulcer. The vertical incisions are carried down to the bone, and the attachments to the jaw of the mucous membrane and muscles between these incisions are cut away as close to the bone as possible. The ends of these two incisions are united by converging lines which meet at a point midway between the lower margin of the jaw and the hyoid bone. The cancerous parts are then removed. The lymphatic glands are dealt with by undercutting the internal flap as far as the submental glands, which are removed; the submaxillary and anterior triangle regions are exposed by means of an incision, curved with its convexity downwards, and which starts from *B*—the point at which the converging incisions meet—to the anterior borders of the sternomastoid muscles *C* and *C*. The flap is turned up, and the submaxillary lymphatic glands are removed, the removal being facilitated by removing the submaxillary salivary gland, with the facial artery and vein. If sufficient room is not obtained, make another incision from the mastoid process along the anterior border of the sternomastoid muscle as far as the level of the cricoid cartilage. In order to join the lip without tension, the external and internal flaps must be divided from their attachments to the lower jaw.

REFERENCE.—¹*Brit. Med. Jour.* May 26, 1906; ²*Pract.* July, 1906.

CANCER OF PENIS (Operation for).

Priestley Leech, M.D., F.R.C.S.

J. H. Nicoll¹ describes a good method of operating in cases of penile carcinoma. In the penis, carcinoma is practically always an epithelioma originating on the surface of the glans or prepuce, usually in the region of the corona. The lymphatics of the anterior half of the penis pass almost wholly to the dorsum, the main vessels passing back on either side of the dorsal vein to the glands of the groin in the first instance, and then to the deep inguinal glands. Few, if any, of the lymphatics from the anterior half of the penis pass to the deep lymphatics of the root of the penis, which channels pass under the pubic arch to the pelvic glands. Only secondarily, and late in the disease, does the growth infiltrate the corpora cavernosa and posterior parts of the corpus spongiosum, and thus reach the lymphatics under the pubic arch, and through them the intrapelvic glands. When this occurs, probably the cases are inoperable, though in some few, bisection of the scrotum and the detaching of the crura penis from the pubic arch may be justifiable. In the usual operable case of penile carcinoma, there is a growth in the anterior third of the penis, with possible extension along the dorsal lymphatics and involvement of the superficial glands in the groin, and subsequently of the deep

inguinal glands; there is no infiltration of the posterior part of the penis, nor are the lymphatics under the pubic arch infected.

Operative measures should aim at the removal of the anterior two-thirds of the penis, plus the dorsal blood- and lymphatic vessels with their surrounding connective tissue back to the pubes, and also the glands and fat of both groins. In cases with marked glandular enlargement, the deep iliac glands should also be removed. The steps of the operation followed by Nicoll are as follows:

1. Pass a sound, and depress the handle between the thighs. Make the Y-shape incision (*Fig. 15*), with the arms of the Y extending along the groin. The leg of the Y is carried along the dorsum of the proximal third or fourth of the penis, and terminates in a loop which obliquely encircles the penis. This loop is only skin deep; the leg is deeper, and the arms in the groins are ultimately deep wounds.

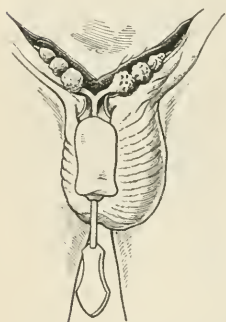


Fig. 15.

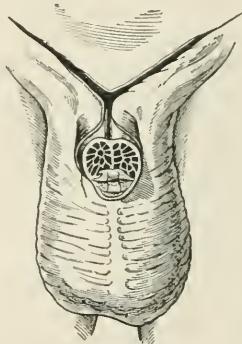


Fig. 16.

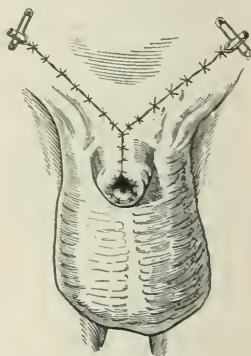


Fig. 17.

Note.—(a) In the three figures the “arms” of the incision are placed, for purposes of illustration, at a higher level than they occupy in practice, where they run along the folds of the groins. (b) The extensive removal of the fat surrounding the inguinal glands is not indicated in the figures.

2. Dissect out all fat and glands *en masse* from both groins, tying the superficial epigastric, superficial circumflex, and external pubic arteries and veins. At the same time open the fascia lata below Poupart's ligament, and having exposed and opened the femoral sheath and raised and repressed the peritoneum, explore the fat surrounding the external iliac vessels for infected glands, freely removing fat and glands from around these vessels.

3. Dissect out the dorsal blood-vessels and lymphatic vessels of the penis, with all the surrounding fascia, leaving the sheaths of the corpora cavernosa bare on their mesial dorsal aspects. The dorsal arteries and vein are tied off close to the suspensory ligament. The lymphatic vessels are traced, *en masse*, with the surrounding fascia, into the groin on either side.

4. At the line of the skin incision round the penis, pass the knife between the corpus spongiosum and the corpora cavernosa, and divide

the two latter ; then divide the corpus spongiosum somewhat anterior to the line of division of the corpora cavernosa, thus leaving the spongy body and divided urethra rather longer than the cavernous bodies (*Fig. 16*), and do it obliquely, so as to leave the inferior lip of the divided urethra longer than the superior.

5. Split the urethra and spongy body transversely to the extent of one-third of an inch.

6. Secure the arteries of the corpora cavernosa and corpus spongiosum by forceps ; time and blood will be saved by tying *en masse*, as the penile tissue is friable, and any attempt to isolate the vessels usually fails. Suture the wound as in *Fig. 17*.

7. Drainage is necessary. One effect of the wholesale clearance of fat and lymphatics from the groin is a lymphorrhœa through the groin wounds ; usually this flow is sufficient to bog the wounds if left undrained. No catheter is tied in ; regular catheterization is practised for three or four days, after which the patient is permitted to pass urine.

8. The dressing : (a) The groins. To keep the skin in contact with the deeper parts, it is necessary to put in each groin a large mass of dressing, secured by a double spica bandage. (b) The penile stump is merely covered with a small guard of gauze wrung from boracic or carbolic lotion, and renewed after each micturition. It is readily secured by a couple of safety pins.

The results in nine cases have been satisfactory.

REFERENCE.—¹*Glasg. Med. Jour.* May, 1906, p. 369.

CANCER OF TONGUE.

Priestley Leech, F.R.C.S.

Butlin¹ gives some interesting and instructive cases of very early conditions of cancer of the tongue. For many years past, he has apportioned three stages to this affection.

1. *Predisposing Conditions*, such as leucoplakia, ichthyosis, chronic superficial glossitis, which may exist for many years without the occurrence of cancer, but which undoubtedly render the individual much more liable to it than are individuals in whom the tongue is healthy.

2. *Pre-cancerous Conditions*, such as warty growths, thick plaques, sore places which are not actually cancerous, but which inevitably proceed to cancer unless they are completely removed or destroyed.

3. *Actual Cancer* in one of its various forms.

He has come to the conclusion, that microscopic examination will not yet enable us to discover cancer in glands when the disease is in an early stage, probably because the cells of the new growth are still so much overlaid by the confused structure of the gland that they cannot properly be distinguished. The notes of seven cases are given, and two years ago, Butlin says, he would have regarded five out of the seven as precancerous conditions, before his eyes were opened by the work of the Imperial Cancer Research Commission.

We are enabled, by the courtesy of the author and of the *British Medical Journal*, to produce three of Mr. Butlin's coloured drawings.

(*Plate V, Fig. A.*) Old leukoplakia of the tongue, of many years' duration. Quite recent development of epithelioma, in the form of a very slightly raised smooth, red plaque, feeling about as thick as a sixpence. Between it and the middle line is a tiny nodule, looking almost like a little pimple. (*Plate V, Fig. B.*) Area of thin leucoplakia on the right border of the tongue, with a small epithelioma, which had developed in the site of a bite received several months previously. (*Plate V, Fig. C.*) Old leucoplakia, of many years duration, with the very earliest condition of epithelioma to the left of the middle line, in the form of a very small area of leucoplakia (*a*), a little more raised, and a little firmer than the rest of the areas of leucoplakia. The recognition depended as much on the slight hardening as on the appearance, and is difficult to suggest in a sketch.

The various forms under which the disease commenced are four in number:—

1. A flat, very slightly raised, smooth, red glazed plaque, feeling like a thin piece of gristle in the surface of the tongue, not thicker than a threepenny or sixpenny piece, and looking and feeling just like a primary hard sore.

2. A white warty growth, not ulcerated, and scarcely indurated at its base.

3. A slight thickening and hardening of an old leucoplakic area, distinguishable rather by feeling than sight, very likely an earlier stage of 2.

4. A nodular plaque, red, and commencing to ulcerate, with drawing in of the surrounding tissues.

The method and extent of the spread of cancer in any organ is of the highest importance in settling the extent of the area round the primary growth which should be removed. Lenthal Cheatle² has made some investigations on the parts removed in 16 cases of cancer of the tongue, and on the post-mortem examinations in 3 cases which died at varying times within eight days after excision of the tongue. For active surgical purposes, he says, cases of cancer of the tongue can be divided into three classes: (1) The early case, in which there is little disease; (2) The advanced case, presumably operable; (3) The inoperable case. All the tongues which were examined belonged to the advanced but presumably operable case, and were removed by Whitehead's method.

Further, the cancer process began in the side or centre of the tongue in its anterior two-thirds in all the cases except one, in which it began at the under surface of the lip, and spread early to the floor of the mouth. The practical result is that, for surgical purposes, one must include in the tongue its extrinsic muscles, and not merely those parts which are covered by mucous membrane. In the second class of cases operated on by Whitehead's method, secondary deposits were found in the stumps of the hyoglossus muscle, the inferior lingualis muscles, and in the fascia covering the genio-hyoid muscles, where

CANCER OF THE TONGUE

(Very early conditions—from drawings lent by H. T. BUTLIN, F.R.C.S.)



Fig. A.

Fig. B.



Fig. C.

a

death occurred within eight days after excision. In this class of case, when disease has spread to the dorsal surface, at or near the centre in its anterior two-thirds, the hyoglossus, the genio-hyoglossus (particularly its genio-glossal fibres), and the inferior lingualis muscles are cancer-bearing on both sides, and their total removal affords the best chance of success. The glands in both anterior triangles should be removed. The whole tongue and its muscles must also be removed in the second class of cases where the disease involves the under surfaces of the tip, and floor of the mouth: the genio-hyoid muscles and their fasciæ must also be taken away. Cheatele thinks one should consider whether this second class of cases should not also be considered inoperable, in view of the serious nature of the operations. Even in cases belonging to the first class he now removes the hyoglossus from the hyoid bone, and in some the hyoglossus muscle as well.

REFERENCES.—¹*Brit. Med. Jour.* May 26, 1906; ²*Pract.* Nov. 1906.

CARBUNCLE.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Coyle¹, who has previously successfully treated boils by **X Rays**, reports three cases of success in carbuncle by the same means. The first was a man of thirty-six, with a lesion on his back which lasted for a fortnight. Ten minutes' exposure with a medium soft tube produced immediate relief from pain. Four other exposures caused it to dry up without discharging. Then two cases, one affecting the hip, the other the neck, were similarly treated, and each was cured in a week.

Evler² reports a case in a man of sixty-two, who had heart disease and was too weak for operation. His method consisted in giving two to three minutes' exposure daily, and a cure ensued.

REFERENCES.—¹*Med. Electrol. and Radiol.* June, 1906; ²*Med. Klinik.* Dec. 3, 1905.

CEREBRAL ARTERIOSCLEROTIC HYPERTONUS. (See SCLEROSIS. ARTERIAL.)

CEREBROSPINAL MENINGITIS. (See MENINGITIS.)

CHILBLAINS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

In the erythematous stage Camus¹ recommends that the part affected should be painted over with **Formol**, pure or 50 per cent, once or twice daily or more frequently according to the stage. He states that the first effect is disappearance of the pain and discomfort, while subsequently the tension and redness gradually lessen, and in a few days cure results. When the vesiculation and ulceration are present, a stage at which the practitioner more commonly sees his cases, the solution must be more carefully used, and must not be used to ulcers. Vesicles so treated end in ulcers, but these are clean and healthy. The skin eventually is left hard and cracked, but may be restored to health by ointments of glycerin or lard. This treatment does not

prevent relapses, but it can readily be repeated, and may be used as a prophylactic.

Reclus² advises that the affected parts should be immersed in very hot water for ten minutes twice daily, and then dressed with the following ointment spread on gauze:—

R	Antipyrin	5 parts	Iodoform	
	Boric Acid		Carbolic Acid Cryst.	ãã 1 part
	Salol	ãã 3 parts	Hydrarg. Perchlor.	$\frac{1}{20}$ part
			Vaselin	200 parts

If the odour of iodoform is objected to, iodol may be substituted, and if there is much pain, 3 to 5 parts of orthoform may be added.

REFERENCES.—¹*Pract. Mar.* 1906; ²*Jour. d. Prat.* 1905, No. 25, p. 385.

CHOLERA.

J. W. W. Stephens, M.D.

F. C. McCombie¹ recommends subcutaneous injections of **Salt Solution** (about 0·75 per cent). In his first series of cases there were only 23·8 per cent deaths among 105 patients; in a following series, one death out of 30 cases. It is essential that the salt solution should be quickly absorbed.

At Tor, in the Sinai peninsula, F. Gotschlich² isolated 38 vibrios from the intestines of pilgrims who clinically showed no sign of cholera, and who died, partly from dysentery, partly from gangrene of the colon. Six of these vibrios turned out to be true cholera vibrios, i.e., besides agreeing with a true cholera vibrio morphologically and culturally, they were agglutinated by high dilutions of a specific cholera serum. Further, it appeared that the true vibrios were all among six pilgrims, the first arrivals from districts where cholera generally prevails, while the 32 other vibrios occurred among pilgrims from a variety of different countries and arriving at a variety of later periods. Such cases as these have been described once before at Tor, and such pilgrims are known as "latent" cholera carriers; but why they gave rise to no epidemic is no more easy to explain than why "manifest" cholera cases do not always give rise to an epidemic.

Stumpf³ uses finely powdered **Clay** in the treatment of cholera. The patients must be fasting. The dose is 70–100 grams for an adult, 30 grams for an infant, 10–15 for a nursling, mixed with five times its weight of water. This amount is swallowed in twenty or thirty minutes. After the dose, no food or alcoholic drink must be given for twenty-four hours.

E. E. Waters⁴ advocates **Izal** in the treatment of cholera. Stock solutions were made, each fluid drachm containing fifteen minims of izal made up with mucilage of tragacanth. Dilute each drachm with seven of water. This amount (1 oz.) is given every hour or two hours as long as necessary. Of 56 cases thus treated, 41 recovered.

REFERENCES.—¹*Lancet*, vol. i. p. 1468, 1906; ²*Zeits. f. Hyg. u. Inf. Krankh.* p. 281, 1906; ³*New York Med. Jour.* Oct. 1905; ⁴*Ind. Med. Gaz.* Dec. 1905.

CHOREA.*Prof. G. F. Still, M.D.*

There are in chorea, says Garrod¹, three main features: the irregular movements, the weakness of the affected limbs, and the emotional disturbance. The movements differ from those of habit spasm in that they do not repeat themselves more than once or twice in succession, but affect now one and now another group of muscles. In degree they vary from extreme violence to so slight a twitch as to be only just noticeable. They tend to be more or less unilateral, at any rate more conspicuous on one side than on the other; and this tendency to a hemiplegic distribution is of importance, as it suggests that chorea is the result of a local cerebral lesion rather than due to any toxin produced by a rheumatic micro-organism. The weakness is present to some degree in most cases, and may be sufficiently marked to cause the case to be mistaken for one of hemiplegia or paraplegia.

The condition of the knee-jerk in chorea is of interest. Very commonly there is a sustained extension of the leg on tapping the patellar tendon, the so-called "hung-up" knee-jerk; often the knee-jerk is diminished or absolutely abolished. This disappearance of the kneejerk may occur suddenly in chorea, and is to be remembered; otherwise it may be attributed to the administration of arsenic. Exaggeration of the knee-jerk in chorea is much less common than diminution.

The emotional disturbance in chorea is very striking, and Garrod suggests that it takes two forms. In some there is a smiling, in others a weeping chorea. Being so emotional during chorea, the child is apt to be frightened very easily, and Garrod believes that the supposed initial fright to which chorea is often attributed is usually subsequent to the real onset of chorea, and is accentuated by the emotionalism.

A very important complication of chorea is rheumatic heart affection. In its slightest degree this may be only a slight irregularity, which indicates chorea of the heart muscle, and is of no particular gravity; but most frequently there is endocarditis, and as has been shown by Lees and Poynton, myocarditis of more or less intensity is present in almost all cases of endocarditis. The earliest indication of myocarditis is cardiac dilatation, and this is not infrequent in chorea, without other evidence of cardiac affection. The association of nodules with chorea is strong evidence of its rheumatic nature; and when these are present there is a special liability to develop pericarditis.

Strasser² states that chorea occurs chiefly in girls at the school age, five to sixteen; certainly it is exceedingly rare at the age of two years. Mackenzie³ records the case of a girl, who at this age had a slight attack of rheumatism, followed five weeks later by chorea, which lasted a month. The heart had been affected in the previous rheumatic attack.

The PATHOLOGY of chorea remains *sub judice*. Garrod (loc. cit.) thinks that the embolic theory of Kirkes must now be abandoned. The question is, whether chorea is due to a specific micro-organism, or whether it is an attenuated pyæmia due to various micrococci. That chorea is cerebral rheumatism can hardly be doubted now.

Poynton and Holmes⁴ have recently added three more cases to those already published, in which they have been able to demonstrate a diplococcus which they call the *Diplococcus rheumaticus* in the pia mater and in the loose connective tissue and perivascular spaces about the blood-vessels of the cortex, but none in the brain tissue itself. Various degrees of chromatolysis were found in the large pyramidal cells and Betz cells of the cortex. These observers hold that the bacteria produce a toxin locally, which acts upon the cells of the cortex, producing symptoms of excitation, or often toxic action is more profound, paralyzing the functions of the cells. Discussing the relation of chorea to rheumatism, Poynton and Holmes conclude that when chorea occurs without any history of rheumatism, it is presumably the primary rheumatic symptom. In one of the three cases examined, the chorea was associated with pregnancy, and the authors state that both on clinical and bacteriological evidence it is probable that chorea in pregnancy is rheumatic chorea. French and Hicks⁵ found that out of 29 cases of pregnancy chorea, 19 gave a history of previous rheumatism or chorea, and 15 of these 19 had suffered from chorea before marriage.

TREATMENT.—Garrod considers that **Rest in Bed** is the most important part of treatment, and quotes the late Dr. James Andrew as saying that the best cure for chorea is six weeks' rest. He has seen very rapid improvement follow the administration of large doses of **Salicylate** in chorea, but says that he is not convinced that much better results are obtained from this treatment than from other methods, or from no treatment at all. **Arsenic**, he thinks, has a marked effect if given in large doses—sufficient to have an almost toxic effect. The most useful drug in the treatment of bad cases is **Chloral**. Recently Garrod has used **Chloralamide**, which seems to quiet the patient and induce sleep, an important matter in severe chorea. **Sulphonal** has a similar effect, but is a dangerous drug, and appears to be useless in the milder cases. This writer notes the curious fact that in bad cases of chorea in which drugs are being pushed, a sudden cessation of all treatment is sometimes followed by an immediate and rapid improvement.

In one case in which examination revealed streptococci in the blood in chorea where arsenic, chloral, and bromide had failed to give relief, about fifteen injections of **Antistreptococcic Serum** were given, and thereafter the chorea subsided. The reporter of this case (quoted by Strasser, loc. cit.) advises blood examination as a routine practice in chorea, and if streptococci are found, the use of polyvalent anti-streptococcic serum.

In a girl, aged eleven years, with severe chorea, which had not been relieved by antipyrin, wet-packs, and tonics, Vidal⁵ used hypodermic injections of **Lymphatic Gland Extract**, and makes the statement that the injections in doses from 1–5 cc. gave no pain; the child's statement on this point is not recorded.

Inglis⁶ recommends a combination of arsenic, iron, and strychnine

as giving better results than heroic doses of arsenic alone. He advocates forced feeding, and especially a liberal supply of **Fats**: cream, butter, fat of meat, yolk of egg, and **Cod Liver Oil**.

Aspirin has been used much in recent years for chorea: 15 gr. are given twice daily for five days, then omitted for three days, then given again for five days. In this way Besançon and Paulesco obtained recovery in 10 cases in three to four weeks, the average duration of chorea, according to Sée, being two and a half months. Germonig⁷ gives larger doses, increasing the aspirin gradually until as much as 46 gr. are given daily, for short periods as already described. He used as much as 77 gr. in one day in a case of pregnancy chorea, with good result.

Langevin⁸ recommends gradually increasing doses of **Antipyrin**, but this must be stopped if albuminuria, weakness of the pulse, or other toxic manifestations appear. **Conium** in large doses has proved useful, and so also has the fluid extract of **Cimicifuga Racemosa**. **Hydrotherapy** also, especially in the form of the prolonged warm bath or the wet pack, has proved serviceable in some cases.

REFERENCES.—¹*Clin. Jour.* Feb. 8, 1905; ²*Pediatr.* Feb. 1906; ³*Mont. Med. Jour.* Mar. 1906; ⁴*Lancet*, Oct. 13, 1906; ⁵*Brit. Jour. Chil. Dis.* May, 1906, p. 224; ⁶*Pediatr.* June, 1906; ⁷*Pharm. u. Ther. Rundsch.* Mar. 1906; ⁸*New York Med. Jour.* Feb. 8, 1906.

CHOREA GRAVIDARUM. (See PREGNANCY).

CLEFT PALATE.

Priestley Leech, M.D., F.R.C.S.

There has been a good deal of difference of opinion as to the age at which a cleft of the palate should be closed. R. W. Murray¹ prefers to postpone operation until the child is two or three years old, and then close the cleft at one operation. He has twice tried Brophy's method of approximating the superior maxillæ, but the results were not satisfactory. He thinks operation on the hard palate may be done in infancy, and closure of the soft palate later, this giving better results than if the whole cleft is closed later.

Arbuthnot Lane has been a strong advocate of early closure (say during the first six months of life) of congenital cleft palate, but most surgeons have preferred operation at a later date. The *Lancet*² thinks that the restoration of the cleft to a natural condition before any attempts at speech are made has many advantages, and goes far to outweigh the possible slight increase of risk. Lane³ gives several illustrations of how rare varieties of cleft palate may be operated on.

J. Berry⁴ read a paper on 67 cases of congenital cleft palate treated by operation. He never operates before the third year of life, and in no less than 43 of the reported cases the children had passed the age of four years. He never refuses operation under twenty years of age, however wide and unpromising the cleft, and he has never advised mechanical treatment rather than operation in any patient under the age of twenty. He follows the method first introduced

by Langenbeck and Ferguson. Two points are essential to success. The first is complete detachment of the soft palate from the posterior edges of the palate bones (this operation is best effected by scissors much curved on the flat). The other point is the position and extent of the lateral incisions that must be made to relieve tension and to temporarily paralyze part of the soft palate. In ordinary cases, when the cleft is not very wide, these incisions should be made after the cleft is sewn up. In cases of very wide cleft, they must be made before the edges can be approximated. The incision must be made close to the teeth, and should not extend so far forward as is represented in some text-books. He thinks Brophy's operation is a terribly severe one, and in his knowledge it has led to death in 5 out of 11 cases. [The shock after this operation in young infants is very great.—ED.] The article is well illustrated.

Peck⁵, of New York, uses Langenbeck's operation, and sometimes uses a protective dental plate to prevent the tongue interfering with the line of suture. He thinks children of from six to seven years of age are the most favourable subjects for operation.

REFERENCES.—¹*Brit. Med. Jour.* Feb. 3, 1906, p. 245; ²*Lancet*, Nov. 4, 1905; ³*Clin. Jour.* June 20, 1906; ⁴*Brit. Med. Jour.* Oct. 7, 1905; ⁵*Ann. Surg.* Jan. 1906.

COLITIS.

Robt. Hutchison, M.D.

Caley¹ classifies the several types of colitis as follows:—

I. *Catarrhal, or simple mucous, colitis.* (1) Acute: (a) Primary (that is, primary infective inflammation of the colon); (b) Secondary (that is, secondary to other morbid states—for example, specific fevers, toxæmias, Bright's disease). (2) Chronic: (a) Irritative type; (b) Atonic and spastic types.

II. *Membranous, or muco-membranous, colitis.*

III. *Parietal colitis and pericolicitis* (including "sigmoiditis," pericolicitis sinistra, and perityphlitis).

IV. *Ulcerative colitis*; (1) Endemic (tropical dysentery); (2) Epidemic (for example, "asylum dysentery"); (3) Sporadic: (a) Primary. "simple," or "idiopathic"; (b) Secondary (that is, secondary to general diseases or to local affections of the lower bowel—for example, stricture).

The essential points in the foregoing classification are the differentiation of simple catarrhal or mucous colitis from the typical membranous or mucomembranous form, the subdivision of the catarrhal cases of group I. into the acute and chronic forms, with the two sub-groups of the latter, into cases associated with diarrhœa (the irritative type) and those associated with constipation (atonic and spastic types); and the recognition as a distinct class of cases included under group III.—that is, severe forms of colitis, in which not only the mucous, but the muscular and serous, coats become involved. That the differentiation of membranous colitis from the simple mucous type is of practical importance, is illustrated in relation to the different treatment of the two types;

the coarse laxative diet so strongly advocated by von Noorden and others, whilst most useful in some cases of membranous colitis associated with constipation and intestinal spasm, is not well borne, and Caley believes is fundamentally unsound in cases of the irritative type of mucous colitis; in the latter, a light nutritious diet such as will leave but a minimal fæcal residue agrees best; in other words, whilst "dietetic exercise" is of importance in the one type, in the other "protection" of the irritable mucous membrane of the bowel is the keynote of successful treatment.

Acute catarrhal colitis needs no special description. Cases of *chronic catarrhal colitis* he divides into two forms:—

1. Those characterized by loose mucous or watery evacuations, periodical diarrhœa, or more or less chronic diarrhœa; "morning diarrhœa," lasting for months or years, is not infrequently of this origin. Associated with these disordered evacuations there may be irregular colicky pains, and local tenderness in the affected regions.

2. The atonic type is characterized by constipation, with excess of mucus in the stools, usually in the form of viscid masses, or ropy strings, the fæces being frequently lumpy and ill-formed. At other times scybala ensheathed in a mucous envelope may be passed. On examination of the abdomen, the colon may be found to be dilated, and not uncommonly fæcal lumps may be detected in the region of the sigmoid. In other cases—those of the spastic type—spasm rather than atony is conspicuous, pain is usually more marked, and the sigmoid may be felt contracted instead of distended. It cannot be too much emphasized that whilst the acute forms of colitis, whether catarrhal or ulcerative, have diarrhœa as a prominent symptom, in the large majority of chronic cases, catarrhal or membranous, constipation is the rule, and frequently most intractable, so much so that cases of "chronic constipation" are not uncommonly found, on careful investigation, to be examples of chronic colitis, with constipation as the dominant symptom. It will be understood that cases of chronic catarrhal or mucous colitis may merge insensibly into the membranous type; indeed, the condition may in some cases be regarded as an early stage of the membranous form, but it is none the less important to make the broad distinction between the two groups, since in many instances, the affection never assumes the typical membranous and more intractable form if appropriately treated.

He believes that chronic colitis is a frequent antecedent of appendicitis, particularly of the milder and more chronic forms, and that it may also complicate appendicitis or simulate it. He restricts the term "*membranous colitis*" to the form characterized by:—

1. The presence of membranous or muco-membranous exudation, as distinct from simple mucous secretion in the dejecta, usually in the form of membranous masses, tubular casts, or pellicular shreds; these in water tend to unfold into membrane-like masses which first gave the affection its name.

2. Irregularity of the intestinal functions, with constipation, often intractable, as its most conspicuous feature.

3. Pain, which is broadly of two kinds—constant or variable dull aching pain or discomfort in some part of the colon, most usually the cæcum, ascending colon, or sigmoid flexure; and paroxysmal pain—ranging from slight attacks of colicky pain to intense enterospasm. This group does not, therefore, include the milder cases which have already been described under chronic catarrhal colitis, nor does it include the more severe cases of chronic colitis in which all the coats of the bowel—submucous, muscular, and serous—are involved as well as the mucous membrane. These are grouped as a separate class, designated parietal colitis and pericolitis, group III. With these limitations, membranous colitis is a fairly well-defined group, with certain etiological and clinical associations, and is usually characterized by a chronic and not uncommonly intractable course. Whilst it may occur in childhood or early life, membranous colitis is usually met with in middle life—25 to 45—and is more common in women than in men, being not infrequently associated with uterine disorder. In its clinical evolution certain phases can usually be traced—a period of chronic constipation, then a mucous discharge is noticed, at first of a glairy or stringy nature, and later more membranous in character; sooner or later more or less pain or discomfort will be experienced, the results of intestinal irritation and irregular peristalsis. Finally, if the condition persists, the muscular coats of the intestine become further weakened, and atonic dilatation of the colon supervenes, or spasmodic symptoms may predominate, and not uncommonly there is associated dilatation of the stomach, tympanites, enteroptosis, and nephroptosis, the last being especially common. The earlier phases of membranous colitis obviously closely correspond with the symptoms of the catarrhal type; indeed, although this is opposed to the view of those who regard “mucous colic” as essentially neurotic in origin, it is probable that many, and it may be the majority, of the cases of membranous colitis originate in this way, a point which is of primary importance in relation to treatment, since to be effective it should be essentially preventive.

As regards the etiology of the membranous form, the author believes in coprostasis, arthritism, and the neuropathic diathesis as causal factors. Influenza, also, is probably a contributing cause in many cases.

Whilst the diagnosis of membranous colitis is usually indicated by the symptoms and the characters of the dejecta, physical examination of the abdomen is most important for confirming the diagnosis and revealing unsuspected complications. In severe cases the abdominal walls are lax; enteroptosis is not uncommon; still more frequent is nephroptosis, being present in 200—272 on the right side and 18 on the left side—out of 1,200 cases in De Langenhagen's series.

The conditions present vary according as atonic dilatation, spasm, or inflammatory changes are in the ascendant. The cæcum is frequently distended and tender, and the distension may be so marked, especially over the ilco-cæcal valve, as to resemble appendicitis. In

long-standing cases the walls of the cæcum and colon may be palpably thickened, similar signs may be present over the ascending colon as high as the hepatic flexure, and both over the cæcum and ascending colon the presence of gas and liquid fæcal matter may produce a gurgling or quelching sensation—"sensation de l'intestin chiffon" of French writers. Another very characteristic sign if present, though more commonly met with in the transverse and descending portions, is a cord-like contraction of the bowel, the result of spasm, which may at times be demonstrated in cases of acute enteralgia. The transverse colon may be distended, so much so as to resemble a dilated stomach, although this is perhaps more frequent in chronic catarrhal colitis than in the membranous form; in the latter, more characteristic is the spasmodic contraction of the transverse colon producing the so-called "colic cord" extending across the abdomen. This is usually a transient condition, due to spasm, but rarely it may be permanent, and due to progressive thickening of the walls of the gut, with stenosis of its lumen. The descending colon and sigmoid flexure frequently exhibit some abnormal signs; of these, tenderness in the left iliac fossa, with distension, and frequently the presence of scybala, are the most frequent, but in this region also a cord-like contraction due to spasm may be very marked. At times, especially if the abdomen is examined during an attack of painful spasm, the walls of the sigmoid flexure may be felt contracting under the hand, as if due to exaggerated peristalsis above obstruction lower down from fæcal accumulation or spasm, and in such a case the contraction and distension will completely subside after thorough evacuation, as from an olive oil enema.

Ulcerative Colitis.—In its most severe and characteristic form, tropical dysentery, the symptomatology of ulcerative colitis is well known, and of recent years much attention has been given to cases coming under sub-groups 2 and 3—that is, to epidemic outbreaks of "asylum dysentery" such as that so ably described by Gemmel, and to more limited outbreaks, such as that described by Dr. Carver in his communication on acute infective colitis to the Medical Society of London. Of the sporadic forms, "simple" or "idiopathic" ulcerative colitis has obtained general recognition since Dr. Hale White published his series of cases in *Guy's Hospital Reports* for 1888. Recent pathological and bacteriological investigations have tended to bridge over the differences between the several forms of ulcerative colitis, and to approximate them to dysentery proper.

As to the clinical characteristics of ulcerative colitis, in typical cases the diagnosis is clear owing to the coexistence of: (1) Symptoms of intensely acute colitis, with pain, diarrhœa, tenesmus, characteristic brownish-red stools of viscid mucus and blood; (2) Severe constitutional symptoms, usually high fever, and always marked prostration and wasting; (3) A third characteristic feature is the frequency of serious local complications—perforation, local or general peritonitis, severe hæmorrhage, and uncontrollable diarrhœa. The diagnosis is, however, not always so easy, the characteristic complex of symptoms

may not be present until quite late in the disease, the onset may be insidious and misleading; indeed, chronic diarrhœa without the characteristic stools may be the only definite symptom. In this, as in the other and less severe types of colitis, great variations will be found, and in typical cases the true nature of the disease may only be discoverable by critical scrutiny of the symptoms, systematic investigation of the dejecta, and careful physical examination of the colon.

Saundby² has described a case presenting the clinical features of ordinary so-called "ulcerative colitis," in which Shiga's bacillus of dysentery was present in the stools, and advances the view that all cases of "ulcerative colitis" may really prove to be merely examples of sporadic dysentery.

Knobel³, in an important study of asylum dysentery carried out at the London County Asylum, Bexley, brings forward evidence to show that an association exists between lesions of nerve cells and fibres, of the spinal ganglia, and atrophy of the cerebral gyri on one hand, and diseased states of certain abdominal viscera, including an acute inflammatory condition of the colon, on the other; and reasonable grounds are furnished for the belief that neurotrophic influence is impaired in many cases of insanity. He is further of opinion that the existence of what has been called the "privy atmosphere" in asylum wards is a factor predisposing patients to dysentery. He formulates the following conclusions: That there is strong evidence in favour of the view that not one but many micro-organisms, either singly or as a mixed infection, can give rise to dysentery; that disturbance of the subsoil in the neighbourhood of an asylum is very liable to be followed by an outbreak of dysentery in that asylum; that evidence supports strongly the view that asylum dysentery can be caused by some micro-organism which normally inhabits the colon and becomes pathogenic when the resisting power of the tissue is sufficiently reduced; that statistical evidence is entirely against the view that dysentery is spread by the transfer of recovered cases from ward to ward; and that the increased precautions which have been taken during the past few years have made no appreciable difference to the incidence of, or the mortality from, this disease.

REFERENCES.—¹*Brit. Med. Jour.* June 9, 1906; ²*Ibid.*; ³*Jour. Ment. Sci.* April, 1906 (abst. in *Lancet*, June 16, 1906).

COLITIS POLYPOSA.

Robt. Hutchison, M.D.

Carey Coombs describes¹ a case of this very rare affection. The patient was a servant girl, twenty-nine years of age, who died after suffering for six months from symptoms resembling those of chronic dysentery. At the autopsy a remarkable condition of the colon was revealed (*Plate I'*), the mucous membrane being studded over thickly with small polypi varying in size from a pin's head to that of a small shot, the larger ones being distinctly stalked. There was no true ulceration of the mucous coat, but here and there some superficial erosion of the summits of the polypi. Microscopically the



Fig. A.

Fig. A.—The left-hand portion is the cæcum and beginning of the ascending colon, in which the polypi are seen to be larger, and arranged singly. The right-hand portion is a part of the transverse colon; here may be seen rounded masses of smaller polypi, separated by linear fissures. The cut surface in the left upper part of the right-hand specimen shows the thickening of the intestinal wall, and especially of the submucous layer.

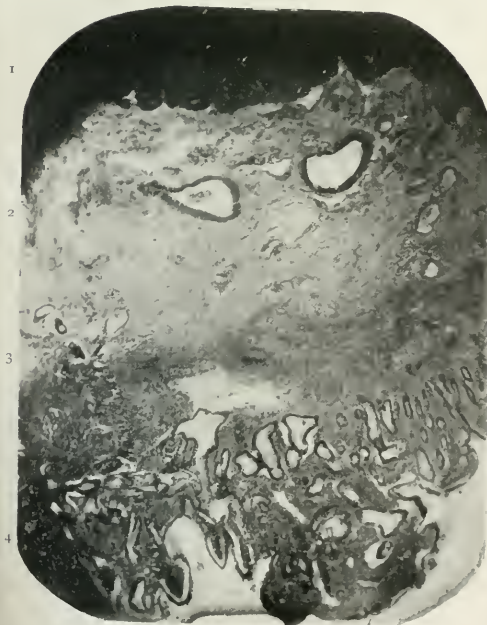
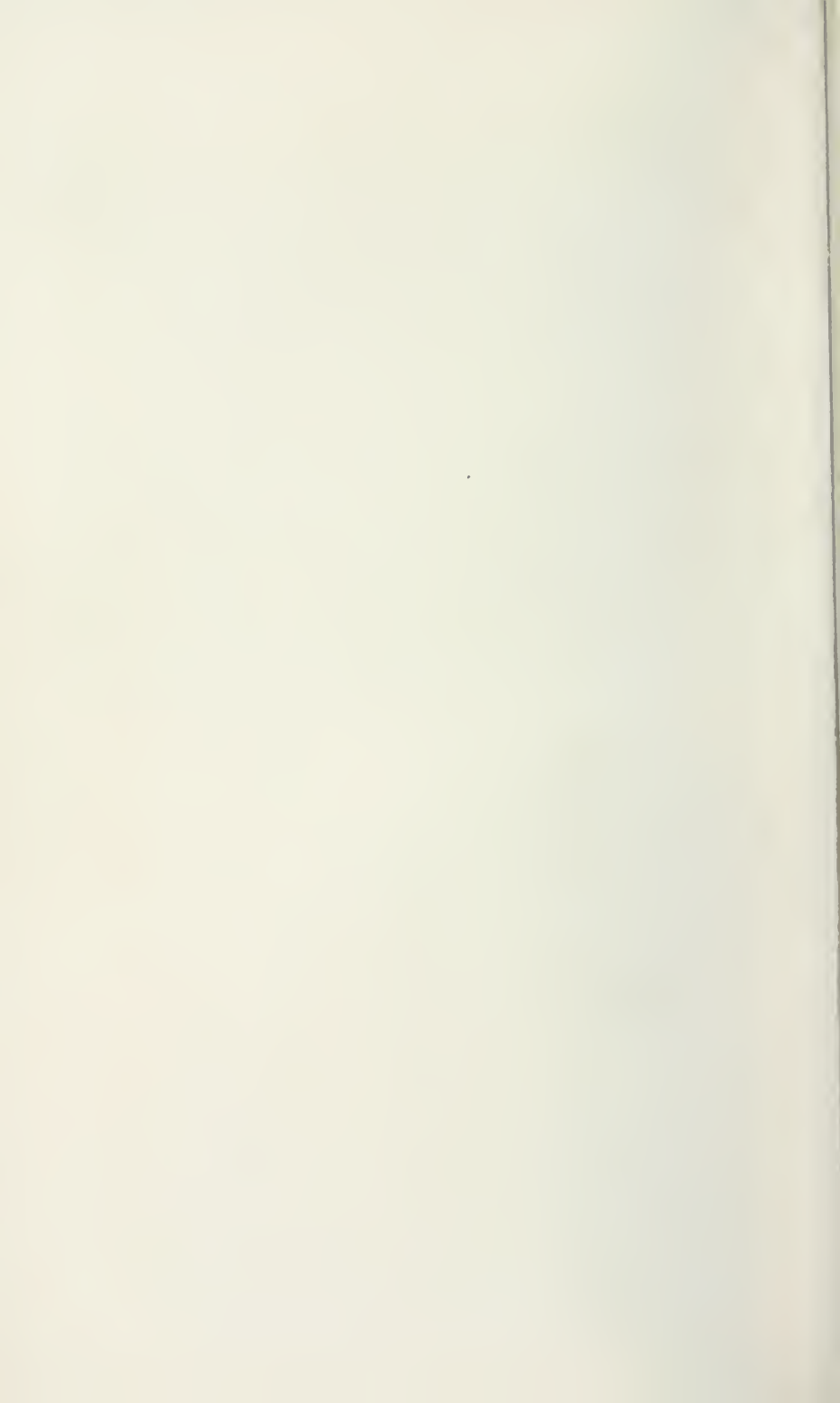


Fig. B.

- 1.—Hypertrophied muscular layers.
- 2.—Zone of submucosa which shows a certain amount of fibrosis.
- 3.—Zone of active inflammatory proliferation of submucous connective tissue.
- 4.—“POLYPI” = Irregular outgrowths of mucous membrane pushed out by proliferation of submucosa. Two are seen, separated by a shallow cleft.

Fig. B. LOW-POWER MICROPHOTOGRAPH.



submucous coat was found to be greatly thickened, the polypi being produced by a great overgrowth of small round cells, probably arising from a proliferation of the fixed cells of the connective tissue. The epithelial cells showed little change.

The only previously recorded case of this affection is one described² by Dr. Pope, of Leicester. In this case also, the patient was a young woman, who succumbed after about six months of what seemed to be chronic dysentery, and in whose case the colon, when examined after death, exhibited a precisely similar condition of polyposis. The specimen is now in the museum of the Royal College of Surgeons.

The writer points out that the term "colitis polyposa" has also been applied to a condition of advanced ulcerative colitis in which such parts of the mucous membrane as have been spared by the destructive process are polypoid in form. The picture of such a colon, however, is one of ulceration with accidental polyposis, not of polyposis with unimportant ulceration; multiple adenomatous polypi are also sometimes met with both in the colon and small bowel, but these are larger and less crowded. More closely similar are those results of chronic inflammation of the stomach wall, known respectively as "état mamelonné" and "cirrhosis of the stomach." In the former, there is a general polyposis of the mucosa, while in the latter, though there is glandular atrophy, there is great hyperplasia, with fibrosis of the submucous coat.

The cause of the condition is uncertain. Perhaps it merely represents the final phase of what we are accustomed to call a simple catarrh of the bowel, though as this is common and colitis polyposa unusual, it is not likely that simple catarrh alone was responsible. It may result, on the other hand, from some specific irritant, such as mercury or arsenic, or some parasite which only occasionally makes man its host. The condition is worthy of note, especially when in the only two recorded instances there is so close a clinical as well as pathological similarity.

REFERENCES.—¹*Bris. Med.-Chir. Jour.* Mar. 1906; ²*Brit. Med. Jour.* 1904, ii. 180.

CONJUNCTIVA (Diseases of the).

A. Hugh Thompson, M.D.

From an examination of 140 normal healthy conjunctivæ McKee¹ concludes that in the great majority of normal conjunctivæ the ordinary pyogenic bacteria and the *Bacillus xerosis* are present. This is in accordance with the investigations of previous observers. The fact should teach us wherein the danger of an abraded cornea lies, and the importance of keeping the conjunctiva well flushed whenever the intact condition of the corneal epithelium is interfered with, either by accident or by operation.

Ante-partum Ophthalmia.—The infection of the conjunctiva in utero with the gonococcus or other microbes is probably not so rare as has been generally supposed, for although Stephenson and Rosa Ford² were able to find only 37 cases recorded before they themselves took

up the subject, cases of ophthalmia neonatorum in which the symptoms develop within twenty-four hours of birth are in all probability due to this cause. From an analysis of the previously published cases, and of an additional 17 observed by themselves, the authors come to the following important conclusions:—

1. Instances of ante-partum ophthalmia are not so uncommon as hitherto believed.

2. About one half of the cases (44·5 per cent) are satisfactorily accounted for by a premature rupture of the membranes, allowing access of micro-organisms to the conjunctival sac of the infant.

3. In the remaining cases (55·5 per cent) a slight injury to the membranes may determine access of micro-organisms, or infection through the uninjured membranes must be assumed to have taken place.

4. Increased temperature of the conjunctival sac in utero, enhanced virulence of the causative micro-organism, feebleness of the babies, slight lateral tears of the membranes, position of the fœtus in the maternal passages, and the condition of the placenta, cannot be shown to be connected with the causation of ante-partum ophthalmia.

5. Several cases of so-called congenital anomalies of the eyes, as corneal opacities, staphyloma, microphthalmos, cryptophthalmos, and lacrimal abscess, are probably to be explained on the theory of an intra-uterine infection.

*Metastatic Gonorrhœa of the Eye*³ has for some years been recognized in the form of gonorrhœal iritis, but it is only recently that we have heard of the conjunctiva as a possible seat of this secondary infection. In diagnosing such a case, primary gonococcal ophthalmia must, of course, be excluded, and it is only in the absence of those organisms which ordinarily cause an acute conjunctivitis—the Koch-Weeks bacillus, the Morax-Axenfeld bacillus, and the pneumococcus—and the presence of a simultaneous affection of the joints, that such a diagnosis is likely to be thought of.

Tuberculosis of the Conjunctiva.—A good deal of attention has lately been paid to this condition, which is certainly a rare one. The following are the forms in which it occurs, according to Parsons⁴:—

1. Small miliary ulcers, which usually caseate, and may or may not coalesce. They attack the palpebral in preference to the bulbar conjunctiva.

2. Grey or yellow subconjunctival nodules, much resembling trachoma granulations, passing on into florid masses of granulation tissue. They usually spring from the fornices, and there can be little doubt that they are often mistaken for trachoma in clinics where trachoma is common.

3. Cockscomb excrescences in the fornices.

4. Polypoid tumours. These are very rare, but the polypoid shape is less surprising when we remember that any tumour of the conjunctiva—even sarcoma—may assume this form: it is due to the perpetual movements of the globe and lids.

5. Tuberculous ulceration may be merely an extension of lupus.

With regard to treatment of this condition, injections of **Tuberculin** have, in some cases, according to Villard⁵, done good, though Stedman Bull⁶ has tried this treatment without any success, and warns us that in these cases the reaction from repeated injections is sometimes so severe that it is wise to limit the dose, at any rate to begin with, to 2-3 mgrams. The treatment recommended is **Extirpation** by the knife, or destruction by the **Galvano-Cautery**. For cases where either of these methods is impracticable, Lundsgaard⁷ recommends the **Finsen Light** treatment, by which he claims definitely to have cured four patients with lupus conjunctivæ.

REFERENCES.—¹*Mont. Med. Jour.* Jan. 1906; ²*Ophthalm.* April 1906; ³Greef, *Berl. klin. Woch.* July 16, 1906; ⁴*Lancet*, Nov. 4, 1905; ⁵*Ann. d'Oculist.* 1905; *Ophth. Rev.* April, 1906, and *Ophthalm.* May 1906; ⁶*Med. Rec.* Dec. 9, 1905; ⁷*Klin. Monats. f. Augenh.* Mar., 1906, *Ophthalm.* Aug. 1906.

CONSTIPATION (Infantile). (See DIARRHŒA).

CONSTIPATION (Spastic).

Robt. Hutchison, M.D.

It is coming to be generally recognized that in many cases constipation is due, not to atony of the bowel, but to an irregular spasmodic contraction of it, at one or more points. Hence the term "spastic constipation" applied to such cases. Herbert Hawkins¹ has recently reaffirmed the reality of such intestinal spasm, and has pointed out its frequent association with sensory (enteralgia) and secretory (mucous colitis) neuroses of the bowel. He points out, too, how closely it may simulate appendicitis, and how often excision of the appendix has been unnecessarily performed in such cases from a mistaken idea of their true nature. He describes in detail a case in which spastic constipation of great severity occurred, and in which laparotomy revealed a spasmodic contraction of about 4 inches of the bowel at the junction of the sigmoid and descending colon, and of about 7 inches of the small intestine as well. The affected portion of the colon was of a pale grey colour, bloodless, strongly contracted, and narrowed down to the size of the forefinger. The narrowed part passed abruptly into the normal bowel above and below. The affected portion of small gut presented the same appearance, being pale, contracted and narrowed, measuring, when flattened out, about $\frac{5}{8}$ inch in breadth. During the process of manipulation, the affected portion gradually resumed its normal size and colour. The writer then proceeds as follows:—

"If the spastic nature of these cases is admitted, it may be legitimate to ascribe a similar origin to a more common form of abdominal pain, of less violence but greater duration. I have the notes of 35 patients, whose sole trouble (large enough in their estimation) was some degree of abdominal pain or discomfort, long continued or occurring in short attacks. Whether the spastic origin of these cases is credited or not, they certainly seem to form a definite clinical picture which can be recognized. I believe that in all of them the seat of the pain was

some part of the colon, though there is no absolute proof of this. I have excluded from the list all certain cases of mucous colic, though doubtless some of them were mucus-passers at times.

"Of these 35, 6 had had the appendix removed before I saw them without thereby gaining any relief from their symptoms. Five others had their appendix removed on my recommendation as a precautionary measure. Being wise after the event, I believe that the appendix was innocent, and the colon at fault in all these 11 cases. One man had previously had an exploration of the sigmoid flexure before I saw him, when nothing abnormal was found. In another case I advised against an exploratory operation, but I believe it was subsequently performed with a negative result.

"Eighteen were males and 17 were females. Of the latter it is noteworthy that only 3 were married.

"Speaking generally, such patients may be intelligent and industrious, but they are none the less emotional. They are neurasthenic in the sense that the nervous power is rapidly exhausted by exertion of body or mind, and is but slowly restored. Secondary depression is a common outcome, and hypochondriasis is often within sight.

"None of them presented any obvious sign of disease apart from the abdominal trouble, though I think that a few of the women had some general visceroptosis.

"'Pain' is the word used by these patients. I expect 'discomfort' would describe it more accurately. It seems to be commonly a dull ache, easily borne for a time, but, as one can well understand, becoming less tolerable after a spell of some weeks or months. Two patients used the word 'cramp' to describe it. One called it a 'stitch.' One spoke of 'wind that would never pass,' and another of a 'weight in the left side.' Sometimes, however, it is more acute. One woman said that she 'had walked about moaning.' Two or three acute attacks of pain in the right iliac fossa, although they may be unaccompanied by fever or any real illness, must always arouse a suspicion of appendicitis. As a rule, exercise does not aggravate it, but is often beneficial by engaging the attention.

"As a rule, the discomfort is distinctly relieved by a satisfactory action of the bowels, but such an action is difficult to get, and strong, irritating purgatives aggravate it. Sometimes defecation is said to be painful: but whether this is so or not, it entails much straining and muscular effort. The stools are commonly narrowed into pencils or ribbons—the effect, I believe, more of anal than of colonic spasm. Pressure, or at any rate massage, will sometimes give relief in the slighter cases, and a hot bath may have a great effect. It is not uncommon for a patient to be aroused early in the morning by the left-sided discomfort.

"In offering evidence that the trouble in these patients is indeed due to spasm of the bowel, it must be confessed that there is no proof of such an origin; but the findings in the case in which operation was performed make it probable. Further, in nearly all of these cases

some part of the colon can be felt as a hard cord about the size of a man's forefinger. This is more common in the left iliac fossa than elsewhere. It is a most striking physical sign, when it is met with above the umbilicus, the affected part being presumably the transverse colon, but I have found this only on one occasion. It occurs also in the right flank in association with right-sided pain, and when this is the case the cæcum is often greatly distended, doughy, or squashy, so that its complete outline can be traced under the palm of the hand. Here as elsewhere the affected part is tender on pressure, but if it is situated on the right side there is not the definite wincing on deep pressure such as occurs at McBurney's point in disease of the appendix. When it is on the left side, the spastic part of the colon is very easily felt. It may end abruptly above and below, or its two extremities may pass beyond reach into the flank and pelvis respectively. It can be rolled from side to side. It is usually tender. It varies in hardness and distinctness from day to day. It may persist for days together unaltered, or may disappear suddenly. I have never felt the contracted part to undergo any such alteration in size or hardness under examination, as is common in intussusception and not uncommon in the portion of the bowel just above a growth.

"In a few cases, which there is no reason to separate from the others, no contracted bowel could be felt. But if a patient is kept under observation, contraction can be felt on one day, and not on another."

In the treatment of spastic constipation, A. Albu² recommends avoidance of all irritation of the intestine, e.g., by purgatives or massage. **Hot Sitz-Baths** of ten to fifteen minutes' duration, and hot compresses are very helpful. **Enemata** of warm oil (8-10 oz.) should be administered every evening in the knee-elbow position. **Belladonna Suppositories** may be used to allay the spasm. The food should contain no indigestible residues.

REFERENCES.—¹Brit. Med. Jour. Jan. 13, 1906; ²Centr. f. Gyn. Feb. 3, 1906.

CORNEA (Diseases of the).

A. Hugh Thompson, M.D.

Marginal Ulceration of the Cornea is in most cases secondary to a conjunctivitis of some sort, but there are some cases which are primary, and these, says Zur Nedden, are associated with a specific organism (the Zur Nedden bacillus), which, though it can remain inert in the conjunctival sac for some time, may later infect the cornea and produce the typical lesion, namely a fine infiltration about 1-1½ mm. from the corneal margin, with which is associated a localized conjunctivitis. The infiltration breaks down, and the resulting corneal ulcer spreads from its ends, and may thus coalesce with other ulcers formed in a like way. According to Zur Nedden¹, this bacillus is the only one that can produce the marginal ulcer, but according to other observers it may also be caused by the Morax-Axenfeld bacillus, which is associated with "angular" conjunctivitis, an organism which is peculiarly susceptible to sulphate of zinc.

Does Interstitial Keratitis Relapse?—This is a question hardly dealt

with in most text-books, but one which not infrequently comes before ophthalmic surgeons. Opinions differ as to the frequency of the occurrence². Fuchs thinks it is rare. Panas considers relapse always to be dreaded, especially when the cornea remains partially opaque after a first attack. Hirschberg states that 30 per cent of cases relapse when insufficiently treated. Wecker notes a relapse in several patients past puberty, after an interval of two or three years, leaving much greater corneal damage behind than did the first attack. Saemisch finds relapse not very rare. E. v. Hippel has followed 16 cases from six to twenty years. Five relapsed after intervals of from two months to nine years. Collomb found 9 out of 170 cases relapsing after intervals of eight months to fifteen years, i.e., 5·3 per cent, a very low percentage compared with the figures, for instance, of Hirschberg. In making similar observations, two points are important. Recrudescences in cases not completely cured must be distinguished from true relapses, and cases must be watched for a great number of years before they can be put down with certainty as non-relapsing cases.

REFERENCES.—¹*Ophth. Rev.* Sept. 1906; ²*Ophthalm.* Sept. 1906, p. 528.

CYANOSIS (Enterogenous).

Robt. Hutchison, M.D.

This condition was first described by Stokvis in 1902. His patient, a man, aged thirty-eight years, had severe enteritis, clubbed fingers, and a very remarkable degree of cyanosis of the skin and mucous membranes, spectroscopic examination of the mucous membranes showing definite methæmoglobin bands. The similarity of the condition to poisoning with certain drugs, as with potassium chlorate and the aniline derivatives, led Stokvis to assume the development in the diseased bowel of some poisonous substance, which, when absorbed, converted part of the hæmoglobin into methæmoglobin. In the same year Talma reported three more cases, all with diarrhœa, clubbed fingers, intense cyanosis of skin and mucous membranes, and methæmoglobinæmia. He demonstrated the characteristic spectral bands in the blood taken from the finger, as well as in the skin and mucous membranes, and showed further that the methæmoglobin was not free in the plasma, but remained attached to the corpuscles. A. A. Hijmans van den Bergh, and A. Grutterink¹ have recently supplemented these observations by an account of three additional cases. They have shown that there are two forms of "enterogenous cyanosis": (1) One in which the blood contains sulphohæmoglobin; and (2) Another in which a true methæmoglobinæmia is present. The first form is the result of chronic poisoning by sulphuretted hydrogen produced by intestinal putrefaction, and is illustrated by the following case:—

A boy, nine years old, was born with atresia of the anus, which was operated upon. After some months a recto-urethral fistula formed, and for years thin, stinking stools mixed with urine were discharged partly by the urethra and partly per anum. For a long time before coming under observation he had exhibited intense

cyanosis of the skin and mucous membranes, with clubbing of the fingers and toes. The blood was dark in colour, and exhibited the spectrum of sulphohæmoglobin. As the result of a further operation, complete patency of the anus was established, the stools lost their stinking character, and in a few months the cyanosis and clubbing had disappeared.

The second, or methæmoglobinæmia, variety of enterogenous cyanosis is exemplified by their other cases :—

2. A man of fifty-one suffered from chronic enteritis, which had at times almost a choleraic character. These attacks were preceded by headache and paralytic sensations in the limbs. The patient was often intensely cyanosed, but the heart and lungs were normal. The blood contained methæmoglobin.

3. A man of thirty-one had been attacked in the East Indies nine years before by enteritis, from which he still suffered. The thoracic organs were healthy, but at times he exhibited marked cyanosis of the skin and mucous membranes. The blood contained methæmoglobin.

By means of a series of ingenious tests (for the details of which the original paper must be consulted) the authors succeeded in showing the presence of nitrites in the blood corpuscles in both these cases, to the action of which the production of methæmoglobin must be ascribed. They leave it undetermined whence these are derived, but suggest three possibilities :—

(a). Increased production of nitrites in the bowel (? by a specific micro-organism).

(b). Increased absorption of nitrites in consequence of disease of the intestinal mucous membrane.

(c). Absence of the usual means, probably present in health, for rendering nitrites harmless.

They incline to the first of these possibilities, but point out that many of the bacteria normally present in the bowel, e.g., *B. coli*, are nitrite-producers.

Gibson and Carstairs Douglas have recently² described another case under the title "microbic cyanosis." The patient was a lady of thirty-six, who had suffered for some years from weakness and headache, with attacks of giddiness, associated with cyanosis. For some time there had been a considerable tendency to diarrhœa. The blood showed the spectrum of methæmoglobin and the presence of nitrites on careful chemical examination. On the other hand, only traces of nitrites could be detected in the fæces. On bacteriological examination, an organism closely resembling the *Bacillus coli* was found in the blood.

REFERENCE.—¹*Berl. klin. Woch.* 1906, No 1.; ²*Lancet*, July 14, 1906.

CYSTS.

Priestley Leech, M.D., F.R.C.S.

Professor Pozzi suggested some years ago the injection of spermaceti into thin-walled cysts of the labium in order to facilitate their removal by dissection. His first method was to tap the cyst with

a hydrocele trocar, empty it, and wash it out with hot water; then spermaceti, recently melted in a water bath, was injected into the cavity of the cyst; and when this latter was fairly distended, ice was placed in the adjacent skin, and at the end of a few minutes the tumour formed a hard mass which could easily be dissected out with cocaine anæsthesia. Pozzi¹ has recently modified this method; he finds that it is more satisfactory to inject the spermaceti heated to 40° C. (104° F.) on the night before operation. It is quite liquid at 104° F., and will solidify satisfactorily inside the cyst, where the temperature is a few degrees lower. By the next day the cyst forms a hard ball, easily extirpated entire.

REFERENCES.—¹*Ann. de Gyn. et d'Obst.* Dec. 1905, p. 754, quoted *Brit. Med. Jour.* Jan. 20, 1906.

DEMENTIA PRÆCOX.

C. C. Easterbrook, M.D.

The dementia præcox of Kraepelin in its three forms—hebephrenic, catatonic, and paranoid—still occupies much attention. As was stated in last year's *Medical Annual*, dementia præcox represents a diffuse symptomatic group of cases, which usually begin in youth, but may come on late in life; cases which usually pass progressively into dementia, or incurable permanent acquired mental enfeeblement, but may recover or may undergo long remissions of good health; cases, therefore, to which the name precocious dementia does not apply, and for which it was suggested that the term mental confusion would seem more appropriate. Kraepelin adopted the name dementia præcox from want of a better descriptive term, and quite recognizes these objections to its use, but explains that it implies nothing more than the usual unfavourable prognosis and the usual appearance in youth. More serious, however, is the question whether dementia præcox really represents a natural group of mental disorders, manifesting themselves in three main forms, hebephrenic, catatonic, and paranoid, with intermediate transition forms. The hebephrenic and catatonic forms are closely allied clinically, as is frequently seen in the combination of stuporose and catatonic symptoms met with, usually as an ominous sign, especially in the youthful insane. The paranoid form is not so closely allied clinically to the preceding, and, indeed, as F. X. Dercum¹ points out, Kraepelin himself now seems to be doubtful as to the inclusion of the paranoid form under dementia præcox. Dercum defines his objection to Kraepelin's use of the term dementia, by stating that it implies from the first a quantitative and permanent loss of mental faculty, comparable to that met with in, say, senile dementia. In senile dementia there is from the first impairment and actual loss of memory, whereas in so-called dementia præcox, the memory, though confused, is at first well preserved, and may not be lost till an advanced stage of the disorder.

Dercum says that the striking feature in the beginning of dementia præcox is confusion, not dementia. He emphasizes the importance of recognizing this early feature of mental confusion, and he defines

dementia præcox as a mental impairment, essentially a mental confusion to begin with, which is usually progressive and goes on to a permanent dementia, with superadded features in varying degrees of depression and exaltation, corresponding to, but to be clearly distinguished from, the exaltation and depression of "mania-melancholia." In the hebephrenic form the progressive mental confusion and dementia are combined with relatively little depression and exaltation, but with hallucinations and vague unfixed unsystematized delusions. In the catatonic form the progressive confusion and dementia are combined with features of depression and exaltation, but especially with motor symptoms in the form of fixed attitudes, cataleptoid spasms, stereotypy, automatism, verbigeration, and even convulsions. In the paranoid form the progressive confusion and dementia are combined with features of depression and exaltation, but especially with the development of fixed and systematized hallucinations and delusions. It is doubtful whether the paranoid form should be included as part of the disease, because in these chronic delusional conditions the delusions and hallucinations form the characteristic clinical feature, the depression and exaltation are usually based on the delusions and hallucinations, and the confusion and dementia are usually but minor clinical features till an advanced period of the disease, when they are probably often associated in the individual with the onset of decadence and senility.

Pathological lesions have been described in dementia præcox, said to be indicative of an autotoxic process, and to consist in degenerative changes (chromatolysis, pigmentary degeneration, and atrophy) of the neurons, especially in the pyramidal and polymorphic layers of the cortex cerebri, with accompanying moderate neuroglial overgrowth and slight vascular thickening.

REFERENCE.—¹*Amer. Jour. Insan.* April, 1906.

DENGUE.

J. W. W. Stephens, M.D.

A. Agramonte¹ draws attention to some of the more important points in the diagnosis of dengue. Cephalalgia, rachialgia, and fever usher in the attack; then, after some hours with intensive suffusion of the skin, in eight cases out of ten the eruption occurs. In many cases it lasts only a few hours, but generally for forty-eight. It is first seen at the elbows, knees, wrists, or neck. When the attack commences, there is first an erythematous flush. Then a maculopapular eruption appears, surrounding irregular patches of healthy skin about three-quarters of an inch in diameter. The eruption extends over the arms, breast, back, and abdomen. Slight albuminuria is commonly present. It is difficult at first to distinguish dengue from yellow fever. Jaundice is absent (this may be the case in yellow fever), and the pulse generally varies with the temperature, and is not slow as in yellow fever.

REFERENCE.—¹*New York Med. Jour.* Aug. 1906.

DERMATITIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Many irritants have been described as causative, and varieties of wood have been previously mentioned, among these being teak, but Evans¹ has recently shown that the soft outside part is not so irritating as the hard dark centre, which contains oil. He mentions that six out of eight men working with it were affected.

Lévi Sirugue², in a lengthy article, points out how important it is to classify these irritant agents, and the variety of the lesions produced, so that, when recognized, proper measures for their prevention may be devised. There is naturally, as he says, an idiosyncrasy in certain subjects—those with soft, thin cutaneous covering, women and young people, being more susceptible; and pathological conditions (in which increase of the body toxins arising from gastric, hepatic, intestinal, renal, or other disorder take first place) make the skin more liable to attack. The action may be chemical or physical; if solids, like powders, they act by causing fine lesions, or if liquids maceration may ensue. In laundresses there are three factors: First, maceration from long soaking in water, the quick passage into liquids of different temperatures, and above all, the caustic agents employed in the process. Chemical and physical causes acting together, as in this instance, leave a skin ready for microbial infection, and the resulting pruritus leads to transmission all over the body. Going into details, among others he mentions as well defined varieties:—

Chlorine Acne.—This occurs amongst workers who prepare the chlorides of lime, potash or soda—the method consisting in passing an electric current through the fluid, which is accompanied by the evolution of chlorine. The skin lesions consist of comedones, papules, pustules, sebaceous cysts, pigmentation, and cicatrices. On the scalp and face comedones appear; sebaceous cysts are common on the ear and neck; the trunk and limbs are less affected, but the acne lesions there are apt to be more confluent and inflammatory than in ordinary acne. On the penis and the scrotum large sebaceous cysts are met with. The mucous membranes are irritated, and conjunctivitis, bronchitis, and dyspepsia accompany the outbreak, which, as will be seen, much resembles that caused by tar or paraffin. Thibierge is quoted as ascribing the whole to absorption of chlorine, not to its contact effect on the skin.

Tar Eruptions (see *Medical Annual*, 1905, p. 208) are also described.

Aniline Hyperidrosis.—Blaschko's researches lead him to consider that this is not due to the aniline or its by-products, but to the cleansing with soda or lime which is carried out at the end of the operation. It is observed also in the case of dyers, laundresses, and workers with carbolic acid, eosine, etc., all of whom come also in contact with alkaline caustics. The hyperidrosis is preceded by a hyperæsthesia of the extremities of the fingers and of the thenar eminence. Subsequently cracks appear, the hands contract, abscesses may form, and on turning up the hand the sweat is seen to ooze in drops.

Tanner's Ulcers—or what are called “Pigeonneau” in France—are fungating ulcers on the palmar surface of the fingers, exceedingly painful, and apt to go on to suppuration, but are readily cured in the early stages by rest, and dressing with **Orthoform** in collodion. The various caustics—bichromate of potash, lime, and soda—are the causative agents, as is proved by the fact that similar lesions occur amongst plasterers, masons, and gold-burnishers, who all use lime.

Sugar Dermatitis—frequent in confectioners and bakers—is very often periungual, and then it is caused by fruit syrups and ices, which add their acidity to the effect of the sugar.

Further, there is a large class of occupation dermatoses whose characteristics are ill defined, these formerly being included under the comprehensive title of eczema, and showing the two phases of that disease, viz., vesicular erythema and pustulation.

Minerals often cause a dry eruption, for instance, erythema of stone-cutters and potters; papular lichenification of bronzers, enamellers, etc.: and eczema of masons and cement-workers.

Arsenical dermatitis is common amongst workers with coloured papers and green dyes; the eruption here is papulo-vesicular, going on to deep ulceration.

Spinners and wool-sorters suffer from a vesico-pustular eruption of the arms and legs, caused by the mineral oils and impurities in the wool.

His list is a long one, and includes also certain animal and vegetable products as irritants, among them being reeds used in roofing, and silk, but their appearance is rare in this country.

PROPHYLAXIS AND TREATMENT.—He truly says that much could be done in using less harmful ingredients in certain works. Ample arrangements for washing should be insisted on, and if possible the supply of something which nullifies the action of the injurious substance. In winter the formation of cracks and fissures should be prevented by the use of glycerin. Workmen should be selected, and any with the slightest skin lesion rejected; while, if affected, they must have a prolonged rest and use rubber gloves afterwards. The urine should be examined. The success of treatment is very dependent on the duration of the eruption, which therefore should be dealt with at its inception.

For erythema he advises the use of ointments or powders containing **Oxide of Zinc**, **Bismuth**, or **Talc**; if the eruption is pruriginous, moist soothing dressings, such as **Chamomile Water** or **Oleo-calcareous Lotions**, are indicated; if crusted, use **Starch Poultices**; while if purulent, feeble antiseptic lotions, e.g., **Boric**, **Resorcin** (1-200) or **Hydrarg. Perchlor.** (1-5000) do best. Any oozing or macerated surfaces are treated with **Bismuth** or **Zinc** pastes, and when thickening is present he advises painting with 5 to 10 per cent **Silver Nitrate** solution every second day.

His second paper³ deals with *dermatoses following the application of drugs*, internally and externally. The treatment is as above, with

cessation of the medicine. Of more recent interest we mention the following: Tincture of arnica, much used in local sprains and inflammations, may cause acute dermatitis with œdema, simulating erysipelas, and even gangrenous ulcerations may supervene.

Salol, now largely employed either as a liquid or powder in dentifrices, may attack the commissures of the lips, producing deep fissures, and subsequently spreading on to the lips and chin in large, crusted red areas.

Picric acid is in favour as a treatment for burns, but it is well to know that erythema, followed by a persistent troublesome pruritus, may result from its use. Most other drug rashes have been already described, but his list is a large and useful one.

REFERENCES.—¹*Brit Jour. Derm.* Dec. 1905; ²*Gaz. d. Hôp.* Feb. 10, 1906; ³*Ibid.* July 7, 1906.

DERMATITIS FOLLOWING X RAYS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Springer¹ himself suffered from this for three years, and in spite of treatment his fingers ulcerated, nails atrophied, and on a middle finger a fungous growth appeared, the condition being so serious that amputation was advised. Before resorting to this extreme measure, however, the **Galvanic Cautery** was used and carried deep down to all the fissures; the raw spots were bathed with permanganate of potash, followed by hydrogen peroxide, the whole hand being subsequently enveloped in a dry dressing of salol. The gratifying result of a cure in three weeks was obtained.

Harris² dispensed with salves, and used sand-paper daily, in addition to having two warts excised, and he also is now absolutely well. All insist—and it is essential—on prevention rather than cure; and cases for the X-ray tubes, and rubber gloves, are quite effective if regularly used.

REFERENCES.—¹*Rev. Franç. de Méd. et de Chir.* Oct. 16, 1905; ²*Brit. Med. Jour.* Sept. 22, 1906.

DERMATITIS HERPETIFORMIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

J. C. Johnston¹, in a paper read at the Toronto meeting of the British Medical Association, traces a common causation to the bullous eruptions of four diseases—dermatitis herpetiformis, pemphigus, pompholyx, and epidermolysis bullosa.

The action of quinine, bromine, and iodine in producing eruptions similar to these diseases, gives a basis for his theory of a toxic infection, the toxin being a product of the body chemistry. At the onset of any of these diseases there is, he states, an attack of headache, malaise, vomiting, etc., often with febrile symptoms. Shock is claimed by some writers as a cause, and he maintains that this acts by causing a toxæmia, as it often produces jaundice.

Urinary analysis reveals nothing except the presence of indican, which is always an indication of intoxication. He gives no local

treatment at all now, and institutes "**Elimination.**" Nitrogenous food is much reduced or prohibited; one or two doses of **Grey Powder** and a **Saline Cathartic** are given at once. Afterwards, **Saline Diuretics** are used, and water given *ad lib.* at least 3 quarts daily, outside of what is taken at meals, whilst in serious cases **Lavage of the Colon** is employed. By this treatment he has seen the disease cut short in full efflorescence and its relapses aborted.

Engman², in a paper written previous to the above, states that 14 out of 18 cases he examined showed indicanuria. The indican was most in excess during acute attacks, and eosinophilia was found to be coincident. He narrates the case of a man of twenty-eight, who, suffering from dermatitis herpetiformis, had also excess of indican in the urine and sweat. The patient was obstinately constipated and suffered from headaches, but under intestinal treatment and the diet indicated by the presence of the indican, he made a satisfactory recovery, although several relapses occurred upon a return to his former diet and habits. Apropos of Johnston's statement, this patient again and again insisted that the eruption could be caused by the administration of potassium iodide internally. This was tried on two occasions, the result being that the eruption appeared each time on the second day, and histologically was identical with the real disease.

Bushnell³ has carried out some researches on the blood of patients suffering from dermatitis herpetiformis, and found that, compared with healthy blood, there is a diminished phagocytic power of the eosinophiles.

REFERENCES.—¹*Brit. Med. Jour.* Oct. 6, 1906; ²*Jour. Cut. Dis.* May, 1906; ³*Brit. Jour. Derm.* May, 1906.

DIABETES.

Prof. J. Rose Bradford. D.Sc., M.D.

TREATMENT BY ACID EXTRACT OF DUODENAL MUCOUS MEMBRANE.—The discovery that the pancreatic secretion is effected through the agency of a substance, secretin, elaborated by the mucous membrane of the duodenum, has led to the hope that inasmuch as many cases of diabetes are of pancreatic origin this substance might be useful in the treatment of the disease. The mucous membrane of the duodenum, strictly speaking, elaborates an antecedent of secretin, prosecretin, which is converted into secretin under the influence of the hydrochloric acid present in the duodenal contents. This secretin is then absorbed in the blood-stream, and calls forth the pancreatic secretion by acting directly as a pancreatic stimulus. Diabetes in some of its varieties is supposed to be dependent on the lack of formation by the pancreas of an internal secretion, and inasmuch as secretin is such a powerful stimulant of the external pancreatic secretion, it was hoped that possibly it might be effectual in causing an internal secretion, and so be of avail in the treatment of the more severe forms of diabetes.

Moore, Edie, and Abram¹ point out that if the duodenum yields a chemical excitant for the internal secretion of the pancreas, and that if

in the absence of the internal secretion glycosuria results, there are at least three ways in which diabetes may result:—(1) The duodenum may fail to yield the secretin; (2) Although the secretin is formed, the cells of the pancreas may not be capable of excitation; or (3) although the duodenum and the pancreas are normal, yet there may be changes in the various tissues of the body, such as the liver and the muscles, and as a result of these glycosuria may ensue. Hence, under the most favourable conditions, all cases of diabetes would not be benefited by treatment with secretin; in fact it is only the first type of case that may be expected to improve. The authors record the treatment of three cases of diabetes with the acid extract of duodenal mucous membrane, and in two cases the results were decidedly encouraging, more especially as these patients were young, and in such cases the prognosis is generally unfavourable. The amount of sugar in the urine was considerable, but the use of the extract was followed by the complete disappearance of the glycosuria.

Diabetic Coma.—Recovery from diabetic coma is very rare, but Sears² records such a case in a boy aged thirteen, who for four months had suffered from excessive hunger, thirst, and polyuria. The urine had a specific gravity of 1033, and contained a trace of albumin, and 5·3 per cent of sugar. After complaining of epigastric pain, the patient became at first dull and subsequently semi-comatose, and the breath smelt strongly of acetone. The respirations were 30 in the minute, deep and full. Eight ounces of sterile **Salt Solution** containing **Carbonate of Soda** almost to the point of saturation were injected under the skin in each mammary region, and large quantities of the solution of bicarbonate of soda were given by the mouth. The stupor rapidly decreased, but the drowsiness persisted for several days. In spite of the large doses of alkali administered, the urine was persistently acid, and acetone was generally present. Convalescence was interrupted by severe convulsions, which were thought to be of uræmic origin.

Temporary recovery as a result of saline infusion is not uncommon in diabetic coma, but complete recovery from diabetic coma with any form of treatment is very rare. Oliver has reported a case of permanent recovery after the injection of $2\frac{1}{2}$ pints of normal saline into the median basilic vein, and according to Sears 15 other cases of permanent recovery from diabetic coma of all grades of severity, from slight drowsiness to complete unconsciousness, have been recorded. The treatment generally adopted has been the administration of a saline or alkaline solution by the mouth or rectum, or by subcutaneous or intravenous injection. The method of administration is of less importance than the amount of alkali, and in the case recorded by Sears very large quantities were given. Hypodermic injections are liable to the objection that suppuration and necrosis may ensue, and large doses by the mouth may produce vomiting and diarrhœa, but some of the best results have been obtained by this method.

Albuminuria in Diabetes.—Lancereaux³ points out that albuminuria in diabetes is much more common in the obese, where the

daily excretion of sugar is relatively small, than in the pancreatic variety of diabetes, where wasting is a marked symptom and large quantities of sugar are excreted. He considers that albuminuria in diabetes may be due to one of the following conditions: (1) An intercurrent malady, especially tuberculosis; (2) To arterial sclerosis with granular kidney; (3) Where there is a considerable amount of albumin in the urine without any intercurrent disease, and according to the author these patients' urines contain neither casts nor leucocytes. He regards this form, which he talks of as albuminuric diabetes, as due to some disturbance of the medulla. (*See also* ALBUMINURIA.)

REFERENCES.—¹*Lancet*, Feb. 15, 1906; ²*Bost. Med. Jour.* Nov. 30, 1905; ³*"Academic Medicine," Lancereaux*, 1905.

DIARRHŒA AND CONSTIPATION (Infantile). *Prof. G. F. Still, M.D.* *Infantile Diarrhœa.*—

ETIOLOGY.—A bacteriological study of 58 cases of diarrhœa occurring in infants in London was undertaken by Morgan¹; 28 of the cases had been classified clinically as "acute infective diarrhœa"; 30 were called "catarrhal diarrhœa." In none of them was any micro-organism found corresponding exactly with the *Bacillus dysenteriæ*, either of Shiga or of Flexner, but three varieties of bacillus were isolated (one found in 28 cases out of the 58), all three of which caused death when given in food to rats. No one of the three bacilli, however, seems to prevail relatively in any particular clinical variety of diarrhœa, so that if these bacilli can be regarded as causal at all, the observations support the idea that no one particular micro-organism is associated specifically with any one clinical type of infantile diarrhœa. Some observers have found large numbers of streptococci in the stools, others even the *Bacillus pyocyaneus*, and there can be little doubt that Nash² is right in saying that there is no one specific micro-organism of diarrhœa. It seems likely also that this writer's suggestion that the house-fly as "carrier" is the essential cause of epidemic diarrhœa may be correct. He holds that in the form of egg or larva or newly-hatched insect, the house-fly resides at one stage of its existence in the superficial layers of the earth or in some deposit of organic matter on the surface of the earth, where it is intimately associated with various pathogenic bacteria; when it becomes able to fly it settles on food, especially on milk, and deposits bacteria which set up diarrhœa, especially in infants, whose food is chiefly milk. He declares that he is not convinced that breast-fed infants are really liable to epidemic diarrhœa, and mentions that amongst 138 deaths of infants under one year of age, there were 68 deaths from diarrhœa in hand-fed infants, and not a single death from diarrhœa amongst the 28 who had been entirely breast-fed.

As Crozer Griffith³ points out, however, it must not be imagined that all bacteria in milk are harmful to infants; bacteria of the lactic acid-producing group clearly exert an inhibitive influence upon some of the bacilli which are particularly dangerous to infants, and herein

lies the explanation of the value of milk purposely soured by the addition of lactic acid bacillus, as in buttermilk, which is particularly useful in diarrhœa. Griffith holds also that heat has some share in the causation of diarrhœa quite apart from the growth of bacteria, and believes that it acts partly by its depressing action on the nervous system, and particularly the vasomotor system of the child, though partly also by interfering with digestion, so that bacteria more easily multiply in the intestine.

Improper feeding is undoubtedly the cause of diarrhœa in the vast majority of cases. Divine⁴ quotes Holt as finding only 3 per cent of breast-fed infants amongst nearly 2000 cases of fatal diarrhœa; defective hygiene in general is also an important factor, and Divine mentions the probability that insufficient clothing predisposes to diarrhœa. Defective precaution in the care of milk is a common cause of diarrhœa, but opinions differ as to the usual place in which the fault occurs. Delépine concluded from experiments that it occurred most frequently at the farm, or during transit. Newsholme, however, showed that at Brighton 53 per cent of fatal cases of diarrhœa must have been infected at home, and believed that the milk had been exposed to infective dust in the house.

SYMPTOMS.—Batten⁵ would classify infantile diarrhœas according to the clinical features of the case and the character of the stools, thus: (1) Irritative diarrhœa, due to improper or undigested food; the stools are loose, bulky, green, with white curds and often a sour odour; there is no fever; (2) Catarrhal diarrhœa, due to prolonged indigestion; the stools are brownish green, contain mucus, and smell foul; the temperature is usually normal, and the infant is less ill than in the previous disorder; (3) Ulcerative colitis, a very rare condition, with much pain, and passage of blood and mucus, but no very high fever; (4) Acute infective diarrhœa, with sudden onset, frequent loose watery stools, often greenish, not offensive; the infant is collapsed, with cold blue extremities, sunken eyes, skin shrivelled, and abdomen lax and flat; the temperature is raised. In this latter group evidently fall the majority of the severer cases of "summer diarrhœa."

Amongst other symptoms supervening in this acute infective diarrhœa, Batten notes the occurrence of cerebral symptoms (drowsiness, with retraction of the head) unexplained by any lesion at autopsy; purpura towards the end of a fatal attack of diarrhœa; and œdema due to parenchymatous nephritis. He refers also to œdema without renal affection. Rocaz⁶ states that this œdema is due to retention of sodium chloride in the system owing to insufficient renal secretion, and therefore advises caution as to the use of normal saline injections where there is but little watery diarrhœa or the urine is scanty. He would give **Bland Drinks**, and doses of **Theobromine**. Romme⁷ quotes observations confirming this view that retention of chlorides is associated with diminished excretion of urine and appearance of œdema.

TREATMENT.—In the very severe cases of acute infective diarrhœa, Batten (loc. cit.) advises as immediate treatment the injection hypodermically of half a minim of the B.P. **Liquor Strychninæ**, which is perhaps of more immediate value than any other measure in combating collapse. He cautions against the use of ether or brandy hypodermically. The former especially is liable to give rise to sloughing of the skin, which may seriously interfere with convalescence. Next he would **Transfuse Subcutaneously** with four ounces of **Normal Saline Solution** (1 dr. to the pint) at a temperature of 150° F. in the glass funnel: this high temperature will allow for the cooling which takes place during the slow process of transfusion. The injection should be made under a pressure of 18 inches, but on starting it 24 inches may be necessary. Batten advises that the injection be made at the side of the thorax, the point of the needle being pushed at least 1½ inches under the skin to prevent the fluid running out along the needle. This subcutaneous transfusion is much easier than intravenous injection, which seems to have no advantage. The transfusion of 4 oz. will sometimes take 20 minutes, sometimes nearly an hour. The proceeding is free from danger, but subcutaneous hæmorrhage and formation of an abscess occasionally result.

After transfusion, the next step in a bad case is the **Hot Bath**. This is a most valuable remedy. The water should at first be 100° F., and then gradually raised to 110° F. Mustard may be added: it dilates the vessels of the skin, lowers the peripheral resistance, and increases the stimulating effect of the bath. A high temperature in the infant is no contra-indication to the hot bath.

When the infant has rallied somewhat under these various stimulants, **Stomach-washing** is advised. The stomach should be washed out with a stomach-tube, size No. 14, with a solid end. Washing through a nasal tube is not advisable, as so small a tube must then be used that it is likely to be blocked by curd and mucus very soon. The only difficulty Batten has found was in one case in which respiration ceased each time the tube was passed through the mouth, so that it had to be withdrawn at once; passage of a tube through the nose in this case, however, was successful. The fluid used for stomach-washing is commonly **Sodium Bicarbonate**, 2 gr. to the ounce, but Myers⁸ recommends a 1–2 per cent solution of **Boric Acid**. In addition to stomach-washing, which has often a strikingly good immediate effect, **Rectal Irrigation** may be useful: 6–8 oz. of warm water are allowed to flow into the rectum, under a pressure of about twelve inches, and the irrigation is repeated until the returning fluid is free from mucus. Subsequently 4 oz. of a 5 per cent solution of **Protargol** may be introduced into the bowel with advantage.

Crozer Griffith (loc. cit.) recommends large enemas of **Starch Water**, 2 level teaspoonfuls to the pint, given tepid; of this a quart or more is to be used, distending the colon as much as possible; **Normal Saline Solution** may be used similarly, or **Bismuth** suspended in mucilage of acacia. **Infusion of Quassia** has been strongly recommended by

Younge⁹ for rectal injection; $\frac{1}{2}$ –1 dr. is injected with a small glass syringe; the injection is repeated every 3 or 4 hours if necessary. This treatment, after a preliminary purge with castor oil, is said to act "like a charm." **Tannic Acid**, $\frac{1}{2}$ –1 dr. in a pint of saline solution, is recommended for rectal irrigation by Southworth.¹⁰ For administration by mouth he advises **Bismuth Subnitrate** in doses of 6–10 gr. every two or three hours, and with this suggests the combination of some astringent, such as **Kino** or **Krameria**, or **Tannigen** or **Tannalbin**. **Salol** also in small doses is useful. **Bismuth Subgallate** or **Betanaphthol Bismuth** is worthy of trial, but in his opinion these are not generally superior to the older preparations of bismuth. Some authorities have doubted the wisdom of giving opium in the summer diarrhœa of infants, but Griffith says that when fever has ceased and there is persistence of watery diarrhœa, opium is invaluable. It is to be remembered, however, that the debilitated infant is peculiarly susceptible to opium, and very small doses should be used at first.

Graham¹¹ advises hypodermic injection of **Morphine** $\frac{1}{100}$ gr. with **Atropine** $\frac{1}{300}$ gr., which may be repeated once two hours later if the child is not improving, or **Paregoric** 10 drops, or **Dover's Powder** $\frac{1}{2}$ gr., may be given every 2 to 6 hours (the age for which such doses would be suitable is not stated, but they might be used with safety for an infant twelve months old). The same writer very correctly lays stress on the need for large doses of bismuth subnitrate if this is used. Small doses are in his opinion quite useless; a child of one year should have $1\frac{1}{2}$ dr. in the twenty-four hours. Myers (loc. cit.) recommends this mixture:—

R	Bismuth. Salicy'.	gr. j–v		Syr. Rhei. Aromat.	Mij–vj
	Bismuth. Subnit.	gr. x–xx		Aq. dest.	ad $\mathcal{Z}$ j–ij

Secundis horis. The doses to be regulated according to the age of the infant, the bismuth being increased until the stools acquire a blackish colour.

Of other drugs which have been recommended recently, **Tachiol** is one of the most promising, according to Piga¹². This drug is an aqueous solution of fluoride of silver, in strength of 10 per cent; it is limpid, colourless, with a metallic taste, but no smell. One part of this in 5000 was given in doses of about 2 dr. every two-and-a-half hours by mouth, or about 3 oz were injected into the rectum two or three times a day. **Cyllin** is said by Batten to be useful. This is a preparation somewhat resembling creolin, and having a powerful antiseptic action.

Lastly, but perhaps first in importance in such cases, is the *feeding* of these infants. Batten uses at first **Albumen-Water**: the white of one egg with four ounces of water. The infant, according to age, has 1 to 2 ozs. of this with 10 to 20 mins. of brandy every two hours. At the end of three days it may be possible to add 1 dr. of whey in each 2 oz. of albumen-water, and then gradually increase the proportion of whey. At the end of about a week it is usually possible to begin cautiously adding **Citrated Milk**, that is, milk with one grain

of citrate of soda to the ounce ; a drachm of this milk is added to the mixture of whey and albumen-water.

Some observers, however, have condemned albumen-water as liable to contamination very easily ; Harris¹³ states that it decomposes and putrefies, and is not digested or absorbed in the intestine, whilst Myers (loc. cit.) states that many children fail to digest it, and it may cause as much trouble as does milk. This writer is in favour of dextrinized gruels, preferably **Barley-water**, which he says should be made thus : Barley flour half an ounce is to be made into a paste with water ; then add enough water to make a pint, boil for twenty minutes, and again make up to the pint with boiled water ; then strain. Salge¹⁴ adopts the Continental method of feeding with a weak infusion of black "**Russian**" Tea, sweetened with saccharin, and as a next step would give a 5 per cent solution of Soxhlet's nutrient sugar, which consists of malt and dextrin, and is entirely soluble. Westcott¹⁵ uses **Rice-Water**, which he thinks is more nourishing than barley-water, and if made "fairly thick" will maintain nutrition for several weeks.

As to the time during which all milk should be withheld, Westcott states that the usual teaching to resume milk cautiously after twenty-four or forty-eight hours is in his opinion most erroneous. No milk should be used until the evacuations show that all signs of the infection have passed away, and this may not be until one or two weeks or more have elapsed ; recurrence of acute symptoms is often due to the doctor's eagerness to return to milk feeding. Even when an attempt is to be made to return to milk, there is sometimes found an intolerance of fresh milk, though the infant may thrive on condensed milk or some patent food. As the infant improves, Westcott would give twice a day a broth made thus : Mix three teaspoonfuls of wheat flour with one teaspoonful of the best butter, brown thoroughly in a frying pan, then add half a pint of hot water and bring to the boil, stirring until the mixture becomes smooth and thick ; flavour with salt, and after it has cooled, add a coffeespoonful of a solid beef extract.

Myers mentions a case in which a premature infant retained nothing until a solution of **Gum Arabic**, 1 oz. to the pint, was given. After forty-eight hours, the diarrhœa and vomiting ceased, and then a teaspoonful of whole milk was added to the twenty-four-hour food, and each day this proportion of milk was increased.

As a method of re-introducing milk into the diet after diarrhœa, Rommel¹⁶ suggests the use of **Artificially Soured Milk**. Skim milk is inoculated with a pure culture of lactic acid bacilli, and to the mixture some sugar and decoction of starch is added ; the resulting sweetish-sour milk is usually well tolerated.

Constipation.—Infants are extremely liable to chronic constipation, and according to Concetti¹⁷ this is often due to dietetic causes. In some infants the fault is insufficiency of milk from the mother's breast : in these cases the infant passes an abnormally small quantity of urine, and gains weight but slowly. If the amount of milk from the mother cannot be increased, the infant should have either some additional

feeds of cow's milk, or should be suckled by a wet-nurse. If the infant passes a proper quantity of urine, evidently the breast milk is not deficient in quantity: the fault must then be in its quality, and the mother's health or habits must be enquired into and suitably regulated. In hand-fed infants the common faults in diet which produce constipation are insufficiency of fat and of sugar; and the use of oatmeal water and of some cream or butter in the milk may be successful. The combination of vomiting with chronic constipation usually indicates too abundant or too rich a food; further dilution and reduction of quantity will remedy these defects. In children just past the breast-feeding period, constipation is due sometimes to lack of sufficient residue in the fæces, and the addition of fruit or vegetables to the diet may be all that is needed. In some cases constipation is due solely to atony of the intestinal muscles, and should be treated by **Massage of the Abdomen** twice daily, **Cold Compresses**, and the exhibition of such a prescription as the following:—

R	Tinct. Rhei	℥j	Tinct. Nucis Vom.	℥ss
	Glycerin.	℥x		

One drachm before meals three times a day.

Or about half-an-ounce of **Infusion of Senna** may be given every morning in a little milk.

When from the pallor of the stools it is judged that there is insufficiency of bile, small doses of **Carlsbad Water** or of **Calomel** are best. Hutchison¹⁸ has recommended **Sodium Phosphate** 5 to 10 gr. in each feed, or a grain of **Sulphur** given in the milk may be sufficient. **Tincture of Aloes** in doses of 3 to 4 min. for an infant aged six months may also be tried, but it should be combined with tincture of belladonna 1 min. to prevent any griping effect, and it is well to give some carminative such as ginger or peppermint water with it.

Sheffield¹⁹ recommends **Exodin** as being tasteless and effectual. It is to be given in doses of 3 to 10 gr. He also recommends the various enemata and suppositories, which Hutchison condemns as acting on one portion of the bowel only, and occasionally setting up a chronic catarrh of the rectum. Burnet²⁰, on the other hand, regards the ordinary purgatives as to be avoided, since they are liable to set up a catarrhal condition in the intestines, and moreover soon lose their effect, so that the dose has to be increased. He prefers suppositories or enemata; the latter, however, are not to be continued long, lest they cause a relaxed condition of the bowel. Hutchison found **Purgen** only fairly satisfactory; it acts chiefly by stimulating secretion with no griping, but has no tonic effect on the bowel apparently; it should be given to infants in doses of $\frac{3}{4}$ to 1 gr. twice a day. Where the stools are white, chalky, or friable, the best remedy is **Podophyllin**—1 to 2 min. of the tincture may be given two or three times daily. Where there is much straining and the motions are hard, half-teaspoonful doses of the **Confection of Sulphur** give excellent results.

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Gaz. July 15, 1906; ⁴Med. Press, Aug. 29, 1905; ⁵Clin. Jour. Jan. 3, 1906; ⁶Gaz. Hebd. de Méd. Nov. 5, 1905; ⁷Presse Méd. 1905, No. 94; ⁸Med. Rec. June, 1906; ⁹Brit. Med. Jour. Sept. 8, 1906; ¹⁰Ther. Gaz. July, 1906; ¹¹Ibid.; ¹²Pediatr. Mar. 1906, p. 217; ¹³Arch. Ped. July, 1906, p. 524; ¹⁴Berl. klin. Woch. Aug. 28, 1905; ¹⁵Ther. Gaz. July, 1906; ¹⁶Ther. d. Gegenw. xlv. 6; ¹⁷Revist. de Clin. Pediatr. Mar. 1906, p. 196; ¹⁸Clin. Jour. May 31, 1905; ¹⁹Arch. Pediatr. 1905, xxii, p. 806; ²⁰Med. Bull. Nov. 1905.

DIPHTHERIA.

E. W. Goodall, M.D.

The introduction of the antitoxin treatment of diphtheria has altered considerably the clinical aspect of the disease, and, in this country at any rate, we seldom see that form which Cadet de Gassicourt describes under the name of *prolonged diphtheria*. Consequently, a paper by Albert Fage¹ on the subject is of interest. He begins by defining what he means by "prolonged diphtheria." Whatever definition is given must necessarily be somewhat arbitrary. In cases not treated with antitoxin the duration of the false membranes varied considerably, though they usually disappeared within a fortnight. But if the membrane persisted for a month or longer, the case was, according to Cadet de Gassicourt's definition, one of diphtheria of the prolonged form. Even prior to the antitoxin treatment such cases were not of great frequency. Fage, however, includes within the definition of prolonged diphtheria all cases in which the membrane persists longer than the average time in cases treated with antitoxin, that is to say, four to seven days, according to the severity of the case. He adds to these, those cases in which the false membrane reappears after having entirely disappeared, cases which have usually been termed relapses and second attacks; and lastly, cases in which symptoms of toxæmia appear several days after the false membranes have disappeared. With the exception of one point to be mentioned below, there is nothing amongst the facts Fage relates which is not already known; nor can his definition be considered as an improvement upon that given by De Gassicourt. Has Fage, indeed, any right to alter this definition, which is convenient and recognized by those who have given special attention to the subject? His definition has the disadvantage of very considerably increasing the number of cases of prolonged diphtheria.

Fage does not discuss the pathology of the toxic symptoms which appear after the false membrane has cleared off; but he gives an account of these symptoms, which are those associated with cardiac and respiratory failure. They are perfectly familiar to English observers, and are usually attributed by them to degenerative changes in the cardiac muscle and in certain cells of the vagus nucleus. Fage says that the treatment of this late toxæmia is the injection of antitoxic serum; but he does not give convincing evidence that this treatment is particularly successful.

Incidentally we learn from this paper that "return cases" of diphtheria are not unknown in France.

While *paralysis* is usually a sequel rather than a complication of diphtheria, yet it has long been recognized that paralytic symptoms (apart from those of the heart) may occasionally arise at an early stage

of the disease. This is especially the case with paralysis of the palate. J. D. Rolleston² has recently made a study of 50 such cases, which have been called *precocious paralysis of the palate*. He first shows that the ordinary late paralysis of diphtheria usually shows itself towards the end of the third week, and he therefore applies the term "precocious" to all cases which arise before the beginning of the third week. In two cases the palate was paralyzed as early as the fifth day, but in most the paralysis commenced on the seventh to eleventh day. In 12 cases paralysis developed before the membrane or exudation had disappeared from the fauces. This early paralysis is observed more frequently in children than in adults, and most frequently in severe faucial cases; thus, 20 of the 50 cases were fatal, and of the 30 survivors, 24 (80 per cent) developed late paralysis. In all the cases but one there was albuminuria.

There is reason for believing, from histological examinations that have been made by more than one observer, that this early paralysis is due to local inflammation of the palate, affecting both muscles and nerves.

J. D. Rolleston³ discusses the significance of *tonsillitis occurring during convalescence from diphtheria*. True relapses of the disease are excluded from his cases; they occurred in 13 per cent. Of the 64 tonsillitis cases, 30 were observed about a fortnight after the injection of antitoxin, and were accompanied by the common manifestations of serum (rash, pyrexia, albuminuria, and occasionally joint-pains). Bacteriological examinations show staphylo- and streptococci. The remaining 34 cases of secondary tonsillitis occurred much later—about the fortieth day. Constitutional symptoms are slight (pyrexia, frequent pulse, transient non-punctate erythema). The tonsillitis yielded readily to local treatment. No diphtheria bacilli were found in three cultivations of each case. The total number of cases in which these observations were made was 900.

According to T. R. Bradshaw⁴, the subcutaneous injection of diphtheria antitoxin lowers the tuberculo-opsonic index. At any rate that was the case in nine instances examined. In one case the depression had possibly lasted for three months. It is clear that further researches are required.

DIAGNOSIS.--While in some directions bacteriology is very helpful in the diagnosis of diphtheria, in others it appears to have increased the difficulties of the practitioner, more especially where the questions of notification and isolation have to be considered. There is considerable controversy as to the significance of the various forms of diphtheria bacillus; and even if there is agreement as to the nature of the bacillus in any particular case, there may be difference of opinion as to the degree of importance which is to be attached to its presence.

Watson Williams⁵, in a paper entitled "Diphtheria in reference to the Infectivity and Notification of Latent Forms," has dealt with questions of this sort in a common-sense way from a practical point of view. He begins by saying that "if we may define diphtheria as

any pathological condition, local or general, due to infection by specific diphtheria organisms, diphtheria is 'latent' when such pathological conditions are unaccompanied by obvious illness." He then points out that as the organism of diphtheria is polymorphic, it is necessary, to avoid ambiguity and facilitate discussion, to adopt some classification; and he is of opinion that Wesbrook's classification is convenient. Wesbrook divides diphtheria bacilli into three main groups: the granular, the barred, and the solid- or even-staining bacilli. "Thus we get type 'A' granular, 'A₁' barred, 'A₂' solid-staining. Type 'C,' commonly described as long diphtheria bacilli: 'C' granular, 'C₁' barred, 'C₂' solid-staining. Type 'D,' usually described as short diphtheria bacilli: 'D' granular, 'D₁' barred, 'D₂' solid-staining." Probably "D₂" is identical with the "Hoffmann," or pseudo-diphtheria bacilli of other observers. Hoffmann's bacillus is regarded by many bacteriologists as a modified and attenuated variety of the diphtheria bacillus.

Watson Williams divides the clinically mild and doubtful cases which are the subject of his observations into three groups: "(1) Patients who afford none of the usual clinical indications of diphtheria, are not definitely ill, and yet are found to be anæmic, have increased pulse-frequency, are poorly, in association with nasal catarrh, membranous rhinitis, faucial redness, and slight subacute tonsillitis, otorrhœa, sores, etc., which on bacteriological examination prove to be diphtheritic. (2) Cases with any of these diphtheritic lesions and no departure from normal health. (3) Persons who present no local lesions and no departure from normal health, but in whom diphtheria bacilli have been found by culture tests."

The author is of opinion that the cases in Class 1 should be treated in every way as cases of diphtheria, but he "dissents from the view, now so generally held, that so long as a few atypical diphtheria bacilli can be recovered from the nose and throat the patient must be infectious." On the other hand, "when such bacilli, or even the short-barred form (D₁ of Wesbrook) is associated with nasal catarrh, chronic tonsillitis, or with abnormal faucial redness, with or without clinical symptoms, such an individual must be considered a source of danger if allowed to mix in a susceptible community, until the organisms are proved to be non-virulent." Some instructive examples are then given of cases of groups 1 and 2, which acted as sources of infection.

With regard to group 3, it is well known that diphtheria bacilli can be demonstrated in the noses or throats of a large number of medical men and nurses who are in attendance upon diphtheria cases; but it has not yet been shown that such persons have been the means of spreading the disease. "We could never push the view that all infected contacts should be notified and isolated to its logical conclusion, and, as a matter of fact, we are guided by clinical experience, and only isolate and treat those who show symptoms, or who, being young children, are of a susceptible age."

Details are given of the procedure adopted in an institute for children

consisting of 44 children between the ages of eight and fifteen, and 14 adults, where a case of undoubted diphtheria had occurred. This case was at once removed to the fever hospital. Two days later the throat and nose of every inmate was bacteriologically examined, and 20 persons were found to have diphtheria bacilli. Circumstances rendered it impossible to isolate these bacillus-bearing individuals, and they were allowed to mix freely with the others. But the following precautions were observed: (1) A dose of 500 units of antitoxic serum was given by the mouth; and (2) The nose and throat of every inmate was sprayed daily with boracic acid or biniodide of mercury solution, 1-2000. None of the persons developed clinical diphtheria; two months later, in only one case could diphtheria bacilli be found.

The author quotes Lambert Lack and others to show that in some districts, at certain times, cases of such conditions as fibrinous rhinitis, associated with virulent diphtheria bacilli, may be very prevalent indeed (e.g., $2\frac{1}{2}$ per cent of all the children attending Lack's hospital practice). He then says, "In such districts it would be futile to notify and quarantine all the healthy children whose noses were infected, for they would soon be re-inoculated after return to school life. Our attitude should be quite different, however, when dealing with schools or communities where diphtheria is rare, and we have to deal with boys and girls who are practically free from diphtheria infection. If a clinical case of diphtheria arises, it is well to culture the immediate contacts and isolate those affected, until by local treatment they are free from diphtheria organisms; but such an ideal method of procedure cannot always be adopted."

The significance of Hoffmann's bacillus is discussed. The writer gives instances in support of his view that it is quite unnecessary, and is indeed absurd, to isolate at any rate apparently healthy persons in whose noses and throats this organism is found. This paper is well worth perusal by general practitioners who are confronted with the problems dealt with in it.

In a previous volume of the *Annual*, attention has been drawn to a form of ulceration of the tonsils and palate which simulates diphtheria in appearance, and is associated with the presence of a spirochæte and a fusiform bacillus, the so-called "Vincent's angina." This ulcerative process may be limited to the tonsils; but it may also spread to the adjacent palate and its arches, and to the mouth. On the other hand, a similar ulceration is seen not infrequently limited to the gums and buccal mucous membrane—an ulcerative stomatitis. Harwood-Yarred and Panton⁶ examined 11 cases of this form of tonsillitis and stomatitis, and in 10 found both of Vincent's organisms; in the eleventh case the bacillus only was found. They are inclined to think that the disease may originate in carious teeth.

[Cases such as those described by these observers are not infrequently sent to hospital with the diagnosis of diphtheria. But only a very hasty examination should lead to this diagnosis. There is no real formation of membrane such as is found in diphtheria; what is

taken for membrane is the surface of a necrotic or ulcerated patch. In diphtheria the membrane rarely spreads to the buccal mucous membrane or the gums. In ulcerative stomatitis there is usually a good deal of viscid muco-pus and saliva poured out into the mouth, and the smell is very offensive, and quite different from that of diphtheria. The cervical glands may be enlarged, there is irregular pyrexia, and the patient, usually a child, becomes wasted if the disease is allowed to go untreated. I have recently had under my care three cases occurring simultaneously in members of the same family; and it is my belief that the disease is communicable from one person to another. It is occasionally seen as a complication of one of the common infectious diseases, e.g., scarlet fever, or measles. E. W. G.]

Occasionally, a case of syphilitic ulceration of the fauces is erroneously diagnosed diphtheria, the wash-leather-like base of the ulcer being mistaken for membrane. J. D. Rolleston⁷ records a case in which an intranasal chancre simulated diphtheria. The patient was a man of twenty-eight. It was stated that diphtheria bacilli had been found in a culture made before admission to hospital. But three cultures of the nose and throat, made after admission, were negative. The lower portion of the nose was considerably swollen and red. The right ala nasi was lined on its inner surface by a membranous deposit, from which a sanious discharge exuded on pressure. The right side of the nose was obstructed. On the chest and abdomen was a polymorphic eruption. The cervical and submaxillary glands were enlarged. Under mercurial treatment the inflammation subsided; the membranous deposit dried up to form a crust, beneath which was a slightly raised granular swelling resembling a chancre. The patient was discharged fifteen days after admission.

TREATMENT.—A very full paper on the injection of antitoxin in diphtheria by the intravenous method has recently been published by A. O. Bisson⁸. An abstract of the literature of the subject is given, together with an account of the technique. The author treated 200 cases in this manner. But a perusal of the paper does not lead one to the conclusion that there is any material advantage in this over the subcutaneous method. In the case of a certain serum, indeed, harm appears to have resulted. The author himself does not express any opinion. The amount of antitoxin given was usually very considerable.

In an article on the treatment of heart failure in diphtheria, C. Borton⁹ gives a short account of two cases of cardiac dilatation, one with, the other without, irregularity; in the former, the condition was present five months after the attack of diphtheria, in the latter four years. According to this writer heart failure is avoided by giving large doses of **Antitoxin** early in the disease and enforcing strict **Rest** in the recumbent position, with avoidance of all excitement. Stimulants are of no avail in the early heart failure of diphtheria; but they are very useful in the cardiac failure that occurs after the first fortnight, with or without other signs of paralysis. Even in these cases, rest is

of first importance; stimulants should only be resorted to in sudden emergencies. **Belladonna** is recommended as a drug worthy of trial in this condition.

Instances of the value of the *prophylactic use* of diphtheria antitoxin are recorded by W. Bligh¹⁰ and W. W. Shackleton.¹¹ Bligh resorted to this measure to stop outbreaks of diphtheria in two girls' schools, one containing 16 boarders and 6 day scholars, the other 70 day scholars and 6 boarders. In Shackleton's case the school was a large one, having 300 boys. The amount used was 1000 units by Bligh, 2000 by Shackleton. Bacteriological examinations were also made, and suspected cases isolated.

In an article on certain complications and sequelæ met in operative cases of laryngeal diphtheria, B. F. Royer¹² discusses chiefly what may be termed the accidents of **Intubation**. He gives cases showing the danger of intubation when the patient is extremely asphyxiated. Reflex apnœa may be instantly set up by the necessary manipulations. [In my opinion, patients in so serious a condition should not be submitted to intubation, even by a skilled operator. Tracheotomy should be performed instead.—E. W. G.] When an intubation tube is inserted in the larynx, the abductors (crico-arytenoidei postici) are thrown out of use, and become atonic. Hence, when the tube is removed, the adductors overpower the abductors and obstruction occurs, necessitating re-intubation. Finally the adductors become atonic also, and there is no dyspnœa on removal of the tube, though there is aphonia. As the muscles recover tone, the voice is recovered.

Auto-extubation is sometimes due to exhaustion of the adductor muscles of the larynx. These, by gripping the tube, keep it in place. When exhausted they become relaxed, and the tube is very easily coughed out. Sooner or later the muscles recover and overcome the atonic abductors, so that re-intubation is required. Sometimes paralysis of the adductors is caused by the pressure of a tube that is too large. Another cause of auto-extubation is irritation of the larynx caused by the tube, or some lesion due either to the tube or to the disease.

The author writes at some length on the causes and treatment of "retained tube." By "retained tube" he means a case which still requires intubation after 3½ weeks' treatment. Rarely is any lesion due to diphtheria the cause of this. The most common causes are atony or paralysis of the laryngeal muscles, or some inflammation or ulceration of the larynx. Royer quotes Preble as saying that the most common cause of these lesions is the persistence of intubation for too long a period. "Preble is convinced that the frequency of retained tubes is due to the attending physician allowing them to remain too long in place." Royer, however, is not prepared to accept this statement, though he admits being "sufficiently impressed by it to direct that all tubes in his ward be removed at the end of forty-eight hours." I am disposed to agree with Preble in this matter.—E. W. G.]

REFERENCES.—¹*Gaz. d. Hôp.* June 23, 1906; ²*Rev. Neurol. and Psych.*

Sept. 1906; ³*Brit. Med. Jour.* May 19, 1906; ⁴*Lancet*, May 19, 1906, p. 1387; ⁵*Laryng.* Nov. 1905; ⁶*Lancet*, Feb. 17, 1906, p. 439; ⁷*Ibid.* June 16, 1906, p. 1682; ⁸*Ibid.* Oct. 6, 1906, p. 935; ⁹*Ibid.* Feb. 3, 1906, p. 283; ¹⁰*Ibid.* July 21, 1906, p. 191; ¹¹*Ibid.* Sept. 15, 1906, p. 722; ¹²*Amer. Med.* Oct. 28, 1905.

DIPHTHERIA OF THE SKIN.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The following cases narrated by Healis and Jacob¹ are of much interest. Two girl inmates of an orphanage developed ulcers on one of their toes. They began as chilblains, and they were treated with boric fomentations, and soaking for ten minutes daily in a weak solution of Jeyes's fluid. Three weeks later a girl in the same dormitory developed faucial diphtheria. The ulcer cases had now increased to four, and on being bacteriologically examined, were found to be diphtheritic. Each ulcer was covered with a translucent membranous slough.

REFERENCE.—¹*Brit. Med. Jour.* Mar. 10, 1906.

DISINFECTION OF THE HANDS.

Priestley Leech, M.D., F.R.C.S.

Von Herff¹ strongly recommends Ahlfeld's method of hot water and alcohol for disinfection of the hands, and says it has given great satisfaction at the Women's Hospital in Bâle.

A. E. Barker² has a very good lecture on the "Hands of Surgeons and Assistants in Operations." The avenues of infection for sepsis may be summarized under two chief headings:—

1. *Access of germs to the injured surface from within the patient's own body*, e.g., lungs, alimentary and genito-urinary tracts.

2. *Access to injured surfaces from without.*

(a). From the surrounding air and solids. The infection from these sources, if ordinary common-sense precautions are taken, is not very great. Currents of air should be avoided.

(b). A wound made by an instrument or other object which is dirty. If seen early, the area should be excised if possible, and the resulting wound treated as aseptic. If seen too late, the wound should be thoroughly scrubbed and treated with antiseptics and left open.

(c). From the instruments employed in treatment. As a rule the instruments employed can be rendered sterile by careful washing and boiling in soda solution. Knives, needles and scissors are spoiled by boiling, but, fortunately, washing with hot water and soap, followed by immersion for a quarter of an hour in methylated spirit, is adequate to render their plane surfaces aseptic.

(d). Overalls, swabs, dressings, etc., may be sterilized by saturated steam. For the sake of simplification Barker uses swabs which are merely 8-in. lengths cut off the same four-fold gauze rollers which are to be used as dressings and bandages, and all come out of the same sterilizing drum as a rule.

Simplification of procedure is one of the most important desiderata in aseptic surgery, and is sadly neglected at present. As regards

ligatures and sutures much might be said, and numberless investigations have been made as to the best material to employ. Any material, if *sterile*, may be left in small quantity in the body without hurt. After giving an extended trial to all materials, he has for years exclusively used linen thread for ligatures and sutures. In addition, the use of ligatures may be restricted almost entirely by the use of hæmostatic forceps. In the last 50 amputations of the breast, he does not think that more than five ligatures have been employed in each case; the forceps of Péan and Spencer Wells have been all that was necessary.

(e) The skin, with all its follicles, is notoriously difficult to clean. Reliance is placed on *repeated* hot baths of the whole body, accompanied by vigorous scrubbing with soft soap and brush. After each bath the area to be uncovered during operation is wrapped up in some sterilized fabric after a couple of hours' soaking in 1-30 carbolic lotion. The increased activity of the glands of the skin induced by the baths and wraps, brings the secretions to the surface, and with them the parasitic organisms. When this has been repeated for some days, the skin is finally washed over with spirit before the operation. In those cases where an operation has to be done soon after the patient is first seen, the skin is thoroughly washed with turpentine or ether, then soaped, shaved, and scoured over and over again with hard brush, hot water and soft soap, and wrapped in the carbolic towel, if possible, for two hours before operation, or as near that as time permits. But in both cases, regarding the skin as possibly impure, Barker has for many years adopted the practice of covering the whole of the patient's body just before operation with a sterilized sheet of double gauze or cloth, through which a hole is cut only large enough to permit of the operation being done through it. This gauze extends from the patient's face to his feet, and covers all his clothing and the operating-table; it is cut from one of the rollers. Macintoshes and wet towels were used when the carbolic spray was in vogue, to prevent chilling of the patient's body, but there is no need for them now, and the sooner they are abolished the better; they cost much time and labour to clean.

(f). The surgeon's and assistants' hands are admittedly one of the weakest points in aseptic procedure. It must be admitted that, after any method of cleansing, a perfectly sterile hand is an exception. After trying many methods, he has greatest confidence in Ahlfeld's and Fürbringer's methods of sterilizing the hands with very hot *running* water and pure soap and brush, followed by spirit. Rubber gloves are very good, in his opinion, for keeping the hands clean for operation, but Barker distrusts them during operation except in exceptional cases. The distrust arises from the fact that they are easily pricked, and when pricked the fluid derived from the perspiration of the hand, with numerous bacteria, escapes into the wound more or less concentrated. They are of value when it is a question of dealing with foul parts before operating on clean tissues. They are used if

the surgeon or assistant have an abrasion on the hand, and house surgeons should be directed to wear rubber gloves in the wards and casualty department when manipulating dirty cases. Another important point is to train oneself and one's subordinates never to touch a foul dressing with the naked hand: forceps should be used. A hand, once infected with bacteria, is extremely difficult to disinfect again. The hands should come as little as possible into contact with fresh cut surfaces. Very extensive operations can be done from beginning to end without the living tissues being touched by anything but sterile gauze or steel instruments, and in cases of foul wounds the advantage of keeping the hands from contact with infective materials is obvious. The old idea that tissues ought not to be held in forceps for fear of injury to their vitality ought to be exploded. Wounds can be covered over with gauze, and the fewer assistants at an operation the better. The surgeon and assistant wash their mouths with an antiseptic mouth wash before operation, having seen that they have no carious teeth, and no influenza cold or other source of sepsis in their air passages; if they have, the mouth and nose are covered with a four-fold sterile gauze bandage tied behind the head.

REFERENCES.—¹*Münch med. Woch.* July 24, 1906, No. 30, p. 1449;
²*Lancet*, Aug. 11, 1906.

DISLOCATIONS.

Priestley Leech, M.D., F.R.C.S.

Hip, Irreducible Dislocations of.—Goldmann¹, from his experience in three cases, thinks that much good may be obtained by applying the older or modern methods of **Reduction** in the place of operation, especially since the exact condition of the dislocated joint can now be explored more thoroughly by radiography. It is important to remember that the head of the femur as well as the cavity of the acetabulum may retain its cartilage in an unchanged condition for years after dislocation has taken place; and though the cavity of the joint frequently becomes filled with fibrous tissue of varied thickness and density, the cartilage may remain unchanged under this newly-formed tissue, which owes its existence to the proliferation of the torn capsule and the wound ligament. Hence it is seen why the pathological conditions of the dislocated joint are mainly dependent upon the gravity of the injury, and only in a secondary manner upon the duration of the dislocation. The old idea that dislocations of the hip became irreducible and inveterate after five or six weeks is incorrect. He first begins treatment by extension; the duration of its application varies according to the degree of shortening found in the muscles and soft parts generally. All attempts at reduction are performed gently, by manipulation alone. **Transposition** of the dislocated bone is a great help, especially in cases of posterior dislocation. After transposition it is easy to move the dislocated bone into any position. When the first attempts at reposition fail, he places the femur in a position as near the acetabulum as possible, and retains it in this position by a plaster of Paris bandage for several

weeks, allowing the patient to walk in his bandage. Transposition of posterior dislocation is a valuable element of treatment in itself, since we know that any point on the horizontal ramus of the pubic bone, or even of the ilium right up to its superior spine, may serve as a good nucleus for a nearthrosis.

Humerus.—R. Jones², of Liverpool, has published some interesting remarks on injuries which are commonly associated with displacement of the head of the humerus. In his experience, the most common complication of fracture of the upper end of the humerus is dislocation of the shoulder. In order of frequency he would tabulate fractures of the shoulder connected with dislocation, as follows: (1) Fracture through the surgical neck; (2) Separation of the greater tuberosity; (3) Fracture through the anatomical neck embracing the tuberosities; (4) Fracture through the neck of the scapula embracing the coracoid; (5) Separation of the lesser tuberosity; (6) Fracture of the glenoid; (7) Separation of the glenoid anatomical neck; (8) Separation of the anatomical neck of the humerus not including the tuberosities. Out of 200 consecutive cases of complicated dislocations of the shoulder, radiography demonstrated 16 connected with fractures of the surgical neck. The etiology of the injury is not clear. In the majority of cases the fracture and dislocation occur synchronously; occasionally the fracture follows the dislocation. In Jones' case the fracture resulted from a direct fall upon the shoulder, and not, as McBurney suggests, from a sudden abduction of the arm.

Immediate Reduction is the best treatment, and it may be simple, difficult, or quite impossible. Jones has succeeded best by forcible extension of the arm held vertically, with often very hard upward pushing of the fragment. Of 80 recent cases, only 36 were reduced. Every method should be tried to reduce the head rather than submit the patient to the very positive risks of operation. The only two operations are excision of the head of the bone and McBurney's method of reduction with the hook: the former should only be practised in old cases in which pressure or obstructive symptoms demand it. He strongly deprecates wiring of fragments in fractures through the surgical neck.

REFERENCES.—¹*Lancet*, Jan. 23, 1906, p. 83; ²*Brit. Med. Jour.* June 16, 1906.

DRACONTIASIS (Guinea-Worm).

J. W. W. Stephens, M.D.

Coppola¹ gives the frequency of site in which a guinea-worm presents itself as observed by him in Cassola as follows: leg 84 times, instep 57, thigh 19, knee 15, forearm 6, arm 6, hand 5, thorax 8, fundament 4, scrotum 5, toe 2, perineum 1.

Graham finds that cases of this affection are most common in June in the hinterland of the Gold Coast. According to Fedschenko, the embryos take five weeks to develop in cyclops, and ten months to develop again into worms in man. The infection thus will take place chiefly in July and August. According to Brown, in the

Malay Archipelago dracontiasis is absent, though cyclops (? species) abound, and cases of the disease are imported from the Coromandel coast.

REFERENCE.—¹*Gior. Med. d. R. Esercito*, p. 92, 1906.

DROPSY¹.

Robt. Hutchison, M.D.

The withdrawal of chlorides from the diet is at present much in vogue for the treatment of dropsy due to Bright's disease and to heart disease, and also for obesity. The idea is that a dehydration of the tissues is brought about; but from whatever cause, the treatment has proved of much benefit in many cases of œdema and ascites. The formation of an appropriate diet has not been an easy task.

In a paper read before the congress at Liège, and which appeared in *Le Bulletin Médical*, Widal goes very fully into all the details of the appropriate diet.

Bread must be made by the baker without salt; the ordinary French bread has, as a rule, 8 to 10 grams of salt added for each kilogram, while the finer and daintier makes contain as much as 15 grams of salt per kilo. There is no difficulty in making bread without salt, or rather without added salt, for the saltless bread necessarily contains the small amount of NaCl present in flour, amounting to 0.70 cgram per kilo.

Meat contains on an average 1 gram of NaCl per kilo., and is one of the foods which can be eaten most easily without salt. It must always be used fresh, and it can be digested raw, grilled, or roasted, without salt, and with butter according to taste. Of the dark meats, beef and mutton are the best to prescribe, and fowl among the white meats.

With fish, the choice is limited to the fresh-water varieties, the flesh of which only contains a few centigrams of NaCl to the kilo. They may be taken fried or lightly boiled. The flesh of salt-water fish contains a large amount of NaCl, reaching, in some cases, 4 grams per kilo.

Fresh eggs are easily eaten without salt, raw or plain-boiled. An egg contains about 25 cgrams of NaCl. The yolks are very useful for making sauces, which help to give a relish to insipid articles of diet.

Fresh butter may be used as freely as the patient likes, and also fresh cream. Saltless cheese may be allowed in small quantity.

Potatoes are an excellent food for renal cases. They are easily eaten without salt, boiled or baked, *sauté* in butter to brownness, in salad, or in a purée with milk.

Rice is equally valuable as a food, and the following may also be included in the régime:—Green peas with butter or sugar, carrots, leeks cooked like asparagus, endive, lettuce, French beans, celery, artichokes, and salads dressed with oil and vinegar.

The preparation of the various green vegetables requires a little management, if they are to be served up in an appetising way without the addition of salt. The jelly, which cooks call "glazing," can, if made without salt, be used for giving a flavour to different sauces

and vegetables. About an ounce to an ounce and a half of this jelly may be used for cooking each day, and additional flavours obtained by the use of tarragon, thyme, bay-leaves, onion, and parsley. It is possible in this way to give a flavour to dishes, so that the absence of salt is quite overlooked. Certain sauces (*Béarnaise*, *Hollandaise*, and *mousseline*) which, as a digestive aid, are usually served with meat, fish, and certain vegetables, may be allowed as a treat, on condition that the patient makes a discreet use of his privilege.

Thin vegetable soups are made easily enough, and can be thickened with tapioca, vermicelli, and the like.

Bouillon contains as much as 10, 12, or even 15 grams of NaCl to the litre, and is, therefore, a regular salt-solution. To its strong chloridization must be attributed the accidents following its use, which have been noticed again and again in the case of kidney, and of some cardiac, affections. Without salt its flavour is far from pleasant, a fact which, to a large extent, deprives it of nutritive value.

Sweetmeats, pastry without salt, and fruit, raw, cooked, or as jam, can be given freely. Chocolate is an excellent food, and has an additional advantage in that in every 100 grams it contains 0.67 gr. of theobromine, which is considered to be an excellent dechloridizing agent.

For drink, a litre and a half to two litres of water should be taken daily, but the water may be replaced in part by mineral waters, which do not contain more than a few centigrams of NaCl per litre. Sugar, lemon, or syrups may be added to the water according to taste. Tea, coffee, and beer, which contain a negligible amount of chlorides and are slightly diuretic, can be taken in moderation. Wine, so long and so strictly prohibited to the kidney case, does not appear to produce the least disadvantage when taken in moderation.

The effect of the diet can be noticed on the first day by the decrease in weight, which proceeds steadily, but much more quickly when the patient is kept strictly to bed. With the disappearance of oedema, the patient returns to a more active life and develops a big appetite. The proportions of meat, bread, and vegetables must be increased in order to provide freely for a "living-ration." It is often surprising to observe the ease with which the régime becomes established, especially if the little culinary devices have been pointed out, whereby, for certain foods, the absence of the savour of salt can be concealed. The diet can be arranged to suit the taste of each patient, and yet answer the requirements of the treatment.

Medical treatment can be associated with the régime. Sudorifics do not eliminate any chloride, while purgatives eliminate comparatively little. Of diuretics, **Squills** and **Nitre** have an insignificant effect; **Acetate of Potash** in two- to three-drachm doses is active but uncertain; **Theobromine** is the most efficient diuretic and dechloridizer. **Digitalis** increases the action of theobromine, but has no effect by itself in renal or cardiac cases, though its action on the heart in the latter class often promotes free diuresis.

REFERENCE.—¹Abst. in *Pract.* Jan. 1906.

DUCTLESS GLANDS, (Disorders of). *H. Batty Shaw, M.D., F.R.C.P.***PARATHYROIDAL GLANDS.**

These small structures, four in number, are situated two on each side of the trachea, in close proximity to the lateral lobes of the thyroid gland. Rogers and Ferguson¹ give instructions by means of which the parathyroidal glands may be dissected clear of the thyroid gland. They find these glands may be of microscopic size or show a diameter of a quarter to three-eighths of an inch; they are red or yellowish brown, and rapidly undergo autolysis; in infants they are proportionately larger than in the adult. The literature dealing with the pathological changes in these glands is very limited; tumours have been found to involve them, and it is alleged that changes are occasionally found in them in infectious diseases. Interest greatly centres in these glands because of their supposed share in the development of unusual symptoms met with in exophthalmic goitre. On experimental removal of these bodies, animals develop tetany, which may be checked by suppression of the thyroid gland or treatment with parathyroidal tissue. On these observations has been based the view that the parathyroids are of service to the economy by neutralizing the harmful metabolites produced when the thyroidal internal secretion has provoked certain metabolic changes, and as a pendant to this theory, Moussu has advanced the view that the parathyroids are responsible for the manifestation of Graves' disease, for they fail by functional or organic insufficiency to neutralize the excessive metabolic changes initiated by the hypertrophied thyroid met with in this disease. Gley, however, considers that parathyroidal insufficiency is only responsible for the convulsive seizures and tetany which occasionally complicate Graves' disease.

Both these views receive some confirmation in a paper by L. Humphrey², who found partial disappearance of these glands and replacement by fat in fatal cases of Graves' disease. Both Professor Welsh and S. G. Shattock have, however, observed fatty changes in the parathyroids in diseases other than Graves' disease, and the latter writer³, who also shows that the priority of discovery of the parathyroidal glands belongs rather to the late Sir Richard Owen than to Sandström, points out that he found a quite insignificant degree of fatty infiltration in the parathyroids of a fatal case of Graves' disease formerly under the care of Dr. Hector Mackenzie. Although Shattock's observation and deduction seriously traverse the view enunciated by Moussu, it cannot be said that they seriously affect Gley's explanation of the origin of the tetany and convulsions which are occasional accompaniments of Graves' disease, for in the clinical account given neither of these symptoms was present. At the present moment what is necessary is that studies should be made of the parathyroids whenever tetany and convulsions have been present before death.

Carnot and Delion⁴ have recently described a most interesting case

of tuberculous parathyroiditis occurring in a tuberculous patient who died whilst exhibiting convulsive phenomena which lasted for eight hours, and exhibited at the same time symptoms of chorea, athetosis, and tetany. The internal parathyroids were found to be sclerosed and infiltrated with pus cells, and the external parathyroids were completely degenerated. This remarkable observation is unique in being the first recorded one in which definite lesions of the parathyroids were associated with symptoms which have been found in men after total thyroidectomy and in animals after parathyroidectomy. The importance of this observation is greatly increased in view of the fact that the administration of commercial thyroid preparations in which certain parathyroidal derivatives are used have been found to relieve certain forms of eclampsia and of tetany.

THE PITUITARY BODY.

Considering the highly glandular character of the pituitary body, it is very singular that the tumours found originating in it should never lead to the development of metastases. It would be wrong to use this fact as a complete objection to the view that probably the so-called tumours of the pituitary body are really merely examples of hyperplasia. Our knowledge of the histology of the various enlargements of the pituitary body is very limited, and it must be admitted that the histology of the pituitary body, as shown when the tissue is examined when cases of acromegaly die, may quite well be a very imperfect picture of the initial pathological change which has taken place in the organ, it may be twenty years previously.

Sir Victor Horsley⁵ has advocated in certain cases of acromegaly the direct attack upon the pituitary body by surgical measures; it is therefore to be hoped, from the point of view of helping to clear up the vexed question of the histology of the pituitary disorder in this disease, that he will report upon this subject in the accounts he gives of the removal of the pituitary body in acromegaly in order to prevent a fatal issue.

As in any other malady, correct treatment can only be based upon a knowledge of the true pathology, but so far we are no nearer a full knowledge of the relationship between the pituitary body and acromegaly than we are of the kindred matters concerning exophthalmic goitre and the thyroid gland. Almost parallel theories have been developed to explain both disorders in connection with the particular gland concerned. Thus, in acromegaly there are three theories in vogue: According to Marie, the disease is due to defective action of the pituitary body; Tamburini and Benda maintain that the disease is due to excessive action of the pituitary body; and lastly, Strümpell and others are convinced that the association is not one of cause and effect, but that both acromegaly and the changes met with in the pituitary body in this disease are results of other causes so far unrevealed to us. Guerrini⁶ has recently studied the functions

of the pituitary body, and considers that it exerts no trophic control over the body, but that its action is antitoxic, a view of the physiology of the gland which will no doubt be used to support Marie's view of the causation of acromegaly, viz., that it is due to an auto-intoxication from defective action of the pituitary gland. It is therefore very important, before we adopt operation as a means of cure for the disorder, to realize that if we do so we are taking such steps rather as leaps in the dark. There remain, however, other reasons why operation may be advisable, not so much as a curative as a remedial measure. As Sir Victor Horsley points out, it may be necessary to operate upon the cranium with a view to relieve pressure in such a way as to avert complete blindness.

Fortunately for the sufferers, acromegaly is not as a rule a painful malady, but it is necessary to remember that certain cases can develop pains of varying degrees of severity. Tramonti⁷ has grouped them in the following way: (1) Osteo-articular pains; (2) Various forms of neuralgia; (3) Muscular pains (cramps); (4) Tabetic-like crises; (5) Acroparæsthesia. These pains can be relieved to a great extent by the use of synthetic drugs such as phenacetin, etc., as well as by well-known anodynes. There are, however, certain neuralgic pains of the face which occasionally defy drug treatment. In a case which recently came before the writer's notice, this feature was a very marked one, and taken in conjunction with the presence of characteristic changes of the field of vision, gave good reason for the belief that whatever was the nature of the pathological process involving the pituitary body, it was at least possible that it was an infiltrating tumour operating much like any other tumor basis cranii. Such cases as these open up another channel for the surgeon's activity, for there can be no doubt that if relief to such severe neuralgia can be given by a direct attack upon the original tumour or upon the nerves which are involved by it, there will be great gain to the patient.

As a rule acromegaly is a chronic malady, but there are cases on record which tend to prove that the symptoms and signs may develop acutely, and more remarkable still, may also disappear rapidly. Bleibtreu⁸ describes a case recalling in part these features, though his main purpose was to draw attention to the view already mentioned, that the acromegaly present in the case he describes was really due to destruction and not hypertrophy of the pituitary gland. The case is further remarkable because of the rapid cure of the typical characteristics of acromegaly. After only nine days in the hospital, "*Le malade sortit complètement remis en apparence*," according to the French reviewer. At the end of eight months he was readmitted with severe hæmoptysis, and died three weeks later of pulmonary tuberculosis. The pituitary body was completely destroyed, probably by a hæmorrhage, and the sella turcica was occupied by a yellow mass composed of newly formed connective tissue, of blood pigment, and of some vestiges of glandular tissue.

THE SUPRARENAL GLANDS.

For some time after the discovery of the precise effect of extracts of the medulla of the suprarenal body, there was a fear, judging from the number of notices in the medical journals, that the profession at large would lose interest in the pathology of the suprarenal glands, and confine itself to a study of the therapeutic application of adrenalin. One solid result of this interest in the effect of adrenalin is that we have been supplied with a ready means of checking local vascular oozing, and the same substance has been used to prolong the effects of cocaine when the latter drug is employed for the purpose of producing local anæsthesia. The internal use of adrenalin for hæmorrhages other than those occurring in the stomach has rightly received the quietus it deserved; for it is quite opposed to scientific teaching to expect that adrenalin would exercise a beneficent action upon the hæmoptysis of tuberculosis of the lungs or check the ravages produced in the internal capsule by a rupture of the lenticulo-striate artery. There can be little doubt, however, that there is a large field for the hypodermic application of suprarenal preparations in cases in which shock and collapse fail to respond to ordinary remedies. Such use, however, should never be carried out for long periods, and for the reason that Josué has shown, that in all probability the individual so treated would suffer by developing atheroma of the arteries, just as happens when rabbits are injected intravenously over a long period of time. This writer has recently reviewed the subject of the employment of adrenalin in therapeutics⁹. Its use is contra-indicated when the arterial tension is raised, when it is suspected that the cerebral vessels are damaged, or when an aneurysm is present. Adrenalin has been found to produce, experimentally, atheroma, aneurysm, and cardiac hypertrophy when given intravenously, by the tracheal route, and even hypodermically (Baduel, d'Amato, and Fagella). Josué concludes that whatever be the route by which this powerful drug is given, in view of the experimental findings, it would be prudent not to give adrenalin for more than six days. By the gastro-intestinal route, the administration of adrenalin is the least toxic, and as much as $\frac{1}{2}$ -1 mgm may be administered in this way.

Naturally, much was hoped from the use of adrenalin as a means of treating Addison's disease; but in view of the mere temporary assistance that can be got by safe doses of adrenalin or suprarenal preparations when given by the mouth as a means of raising blood-pressure, and in view of the dangers which are clearly associated with the prolonged introduction of the drug by the intravenous route, little can be expected in the treatment of Addison's disease by this means. A. Rendel Short¹⁰ has described the pigmentation and changes of blood-pressure in a case of Addison's disease which came under his notice. He used both suprarenal preparations and digitalin as a means of improving the vascular tonus, and appears to have raised the blood-pressure of his patient by the use of the latter drug rather than by

the former. One cannot help suspecting that the patient's blood-pressure rose to normal spontaneously, and that the improvement of his general condition was also of like nature; it is well known that cases of Addison's disease improve most rapidly entirely unaided, and, moreover, it is well known that mere low blood-pressure does not in itself necessarily mean a symptomatic accompaniment.

A practical point is raised by Moulinier¹¹, for he regards the pigmentation and muscular fatigue that are met with in syphilitic patients who are undergoing mercurial treatment as being due to the harmful influence of this drug upon the suprarenal bodies. This view is supported by the observations of Oppenheim, Bernard, Bigaud, and others, who have shown experimentally that mercury is capable of causing lesions of the suprarenal capsule.

One of the most interesting tendencies of modern physiology is to be observed in the impetus given to research into the influence exerted upon various secretive tissues such as glandular structures, by substances derived from other tissues. To quote a comparatively recent development in this direction, mention may be made of the influence of certain constituents of the upper intestinal wall in provoking under normal conditions a secretion of the pancreas quite independently of the intervention of any nervous mechanism. Other examples may be readily quoted of the influence of so-called internal secretions upon other tissues of the body. Even before these curious associations were definitely proved to occur, clinicians had made observations which only now receive anything like an adequate explanation, e.g., it is known that males when developing the signs and symptoms of exophthalmic goitre may also suffer from enlargement of the breasts, and monsters showing failure of development of the genital organs may also have no suprarenal glands. Marchand has also shown that a case of feminine hermaphroditism, besides revealing, post mortem, atrophied ovaries, showed increase of the volume of the suprarenal bodies.

Théodossier¹² has studied recently the effects of castration upon the suprarenal bodies. He found that there really does appear to be some connection between these two structures, for after castration, the suprarenals were hypertrophied both in the stroma and in the parenchyma of the greater part of the cortex. The medullary portion and the zona reticularis of the cortex had more often undergone a certain degree of reduction.

THE THYMUS GLAND.

Till recently, the action of the thymus gland, its share in the development of the body, and its pathological bearings, have received scant attention. Important papers have, however, now been published by Dudgeon¹³, Fortescue-Brickdale¹⁴, and Gillman Moorhead¹⁵, dealing with its anatomy and physiology, as well as with the curious alliance between thymic hypertrophy or persistence and such apparently widely divergent diseases as exophthalmic goitre, acromegaly, thymic

asthma, myasthenia gravis, lymphatism, and leucocythæmia. Atrophy of the thymus has been alleged to be a frequent accompaniment of marasmic diseases. Friedleben and Mettenheimer have shown that animals deprived of the thymus developed manifestations of rickets, and observations have been published tending to show that the administration of thymus gland was of benefit in rickets, relieving such developments as spasm of the glottis. Fischl¹⁶, as a result of experiments on herbivora, could not find anything to support the contention above referred to and confirmed by Basch. The latter observer, criticizing Fischl's results, pointed out that rickets could only develop after the extirpation of the thymus in carnivora; moreover, Fischl had removed the thymus by an operative procedure (drawing it from below the sternum) which was inadequate; the sternum should have been split, and the gland totally removed, to ensure subsequent rachitic manifestations.

Considering the number of important diseases in which the thymus is enlarged, though not necessarily operating as the cause, so far as we know, of the particular disease in question, it is of interest to hear of Gillman Moorhead's attempts at developing a thymotoxic serum. As a result of experiments of the same order in developing a thyrotoxic serum, little would be expected. Moorhead concludes as a result of his incomplete investigations that the serum of animals repeatedly injected with thymus preparations is not able (1) To agglutinate emulsified thymus glands *in vitro*; (2) Has no action on the white cells of the blood examined on a warm stage; and (3) Has no constant effect on the animals into which it was injected.

Fortescue-Brickdale finds that children suffering from marasmus commonly exhibit fibroid changes in the thymus, but not always, and the weight and size of the organ are usually diminished; similar, but not such constant, changes are found in children suffering from secondary atrophy. Mere starvation does not cause this fibrosis of the organ.

Hedinger¹⁷ has published a report on 12 cases of thymus death. In 5 he found pure hyperplasia of the thymus, and in 7 more or less well-marked hyperplasia of the thyroid gland. Microscopically the thymus glands showed distension of the blood-vessels and hæmorrhages; the remaining lymphatic apparatus was not enlarged. Hedinger also made observations of 5 other cases similar to the above, and was able to demonstrate post mortem that there was flattening of the trachea. He considers that the status lymphaticus of children and the hyperplasia met with in the new-born are widely different conditions.

So difficult is it to discover any medical means of treating thymic asthma in infants, that very considerable importance attaches to a contribution by Ehrhardt¹⁸ on the surgical treatment of such a case. He refers to two earlier cases which were cured by what may be called "exothymopexy," and then refers to his own mode of successful operation, viz., extirpation of the thymus—the first on record for this

disorder. An incision was made in the middle line of the neck, and the thymus drawn up without any difficulty, and removed: the trachea was found to be flattened from before back, and on the fifth day after the operation could be seen to have assumed the normal contour.

THYROID GLAND.

PATHOLOGY.—Nothing is more obvious in a review of the literature dealing with the disorders of the thyroid gland, than that myxœdema, by reason of the successful treatment by organotherapeutic measures, ceases to attract very much notice beyond, perhaps, an occasional reference to the anomalous cases in which the disease is resistant to the methods mentioned. So firmly established is the principle that substitutional organotherapy is, at least in the case of athyreia or myxœdema, an adequate means of treatment, that the reiteration by Professor Swale Vincent¹⁹, in a most exhaustive review on the subject of internal secretion and the ductless glands, of conclusions arrived at by himself and Jolly, requires careful consideration. How fundamental are these contrary opinions based on experimental work is shown by the summary of their conclusions: "It cannot be truly said that either thyroids or parathyroids are essential for life, since it is frequently possible to remove either or both without causing death." "In no animal have we been able to induce symptoms resembling myxœdema." "Myxœdema and cretinism must then, we think, be due to causes more complex than simple thyroid insufficiency." The same writer does not shirk the obvious suggestion that probably he and his fellow-worker had not succeeded in removing all the tissues in question, for they were at pains to discover any further outlying fragments of tissue, and as they cogently remark, if such outlying tissue is so frequent in the form of accessory glands, then the importance to life of the thyroid gland (proper) ceases to have the value hitherto attached to it.

Such conclusions are so disturbing that we are forced to think, in the light of the vast amount of evidence in favour of the athyreic basis for myxœdema, as judged by therapeutic results, that there must be some fallacy, and the most simple one appears to be that possibly these workers expected too rigid a parallelism between human myxœdema and the experimental athyreia which they induced.

When we turn to the subject of exophthalmic goitre, the literature is found to be rich in frequent reference to both the clinical manifestations and the various theories which have been developed in explanation of the disease.

The association of Graves' disease with the thyroid gland, a view which, it must be remembered, is not accepted by all writers, is largely due to the advocacy of Moebius. No less an authority than Ehrlich has advanced the view that we are wrong in believing that the thyroid disturbance is the primary cause of the disease; it is rather, according to him, a secondary effect due to a primary neurosis. Despite the

obvious difficulties in considering that in exophthalmic goitre the thyroid gland is merely in a condition of excessive function, *v.* Hansemann²⁰ subscribes to this view, and considers that the hypertrophy of the thymus met with in a certain proportion of cases of Graves' disease is secondary to the increased functional activity of the thyroid gland.

Although at the present time the more generally accepted view of the physiological relationship of the thyroid and parathyroid glands is, that the one gland by an internal secretion produces toxic substances as a result of its action in metabolism, which, under healthy conditions, are neutralized by the action of the other glandular tissue, it must be remembered that other views are stoutly maintained by other writers. For example, Blum²¹ contends that the thyroid functions not as an organ with an internal secretion, but as an excretory organ which removes from the system iodine and, especially, removes this element from the central nervous system. Kraus²², passing in review the various nebulous theories of the causation of Graves' disease, discredits Blum's view, basing his objection on work by Gley and Bourcet and by Bönninger, who have shown that in health human blood serum and the central nervous system are not free from iodine. Despite all that has been said to the contrary, there still seems good reason to believe that the explanation of the clinical manifestations of Graves' disease is best met by the view that probably the complaint is due to a perverted action of the thyroid gland—a dysthyroidism—and it must be left for the future to decide of what this dysthyroidism consists.

Adenomata of the thyroid gland, which appear to contribute so large a share of the cases of so-called simple goitre, provide us with problems of very considerable interest. So obvious is it that the old-time view of the unity of simple, as compared with malignant glandular tumours, breaks down again and again when applied to the microscopic differentiation of such developments, that no one can be blamed for seeking elsewhere for some explanation of this occurrence. In view of the advances made in our knowledge of the etiological association of carcinoma and sarcoma cells with certain foetal vestigial cells, it would be of interest to prosecute an enquiry as to the findings of similar cells in the more benign adenomata. That there may be some connection is shown by observations by Bloodgood²³, who reports on 21 cases of adenoma of the thyroid gland, and remarks on the relation between the onset of adenomata and puberty and pregnancy; all his cases belonged to the female sex.

CLINICAL ASPECTS.—Gilmour Thompson²⁴ has drawn attention to the acute exacerbations met with so characteristically in Graves' disease, and which cause so much anxiety to both the patient and the attending physician. For reasons which are very obscure, it is quite well known that the disease will suddenly show acute symptoms, such as diarrhoea, paraplegia, dyspnoea, etc. Gilmour Thompson advances the view that in many such cases the agent responsible for

the exacerbation is some simple intercurrent malady of an infectious nature, such as bronchitis, tonsillitis, etc. One or other of such infections was found in 16 out of 43 cases of Graves' disease at the onset of serious acute exacerbations. It is known to the writer that the symptoms of Graves' disease, which had been quiescent for about two years, in the case of a young man afflicted with this malady since puberty, developed to such an extent as to entirely incapacitate him from work within a week or two of an attack of acute gonorrhœa.

Hector Mackenzie²⁵, in a lecture on Graves' disease, draws close attention, not only to the usual well-recognized signs of the disease, but also to a number of signs which, by reason of their infrequency, are apt to be overlooked or accidental. One point of special interest to which he calls attention is the occurrence in various parts of the body of localized patches of hard œdema, recalling that met with in myxœdema; one particular localization, which is apt to produce a still more striking sign than is usually met with in the disease, is a marked swelling of the upper eyelid. No doubt these curious patches of hard œdema are explainable on the ground that the individual under examination is really an example of the comparatively rare condition of exophthalmic goitre becoming one of myxœdema—a thoroughly well-recognized possibility, though, of course, the converse is, despite the sketchy accounts of such cases as are given by Continental writers, quite unknown, and its apparent occurrence is explained on the ground of therapeutic hyperthyroidization.

Probably the occurrence of myxœdema following in the wake of exophthalmic goitre is an explanation of the puzzle described by Dock²⁶ in his observations on exophthalmic goitre; a case whilst in the hospital developed general œdema of intense degree and hardness but without any discoverable cause. The disappearance of the œdema may possibly have been due to the effect of thyroid substance, the use of which in this malady, as the writer says, is not "as irrational as many think." J. Dreschfeld²⁷ calls especial attention to a sign of widespread occurrence apparently due to vascular excitability. Every case of Graves' disease which has come under his notice showed dermatography, which in some cases assumed the characteristics of Sir William Gull's "urticaria factitia."

Stanton²⁸ has drawn attention to an observation which he has made, viz., that in tuberculosis there is a comparatively frequent occurrence of symptoms similar to those met with in disease of the thyroid gland in which there is apparently increased activity. Amongst the symptoms he quotes as occurring in the earlier stages of tuberculosis suggestive of this complication, are "rapid pulse, palpitation, tremors, emaciation, pallor, tendency to sweating," but no eye symptoms. In a second group of more advanced cases of tuberculosis, besides diarrhœa and tremor there is usually slight exophthalmos with marked Stellwag's, von Graefe's, and Moebius' signs. At first sight one is apt to be critical of such a position as Stanton takes up, and to suggest that, after all, the signs he quotes would do equally well, in the first group at least, for

pure tuberculous cases, but until we know why infectious diseases which have assumed more or less chronic character are so liable to cause tremors, as, for example, in meningitis, a tendency to Stellwag's and von Graefe's signs, the curious coincidence he calls attention to deserves consideration, more especially as we really are so little informed as to the true pathogenesis of exophthalmic goitre. I can corroborate Stanton's observations on the frequency with which at least Stellwag's sign is present in tuberculosis of the lungs.

MEDICAL TREATMENT.—No excuse is necessary for discussing the medical treatment of Graves' disease before other methods, for when all plans so far adopted have proved either to be inefficacious, or to be obscured by the possibility of "cure by suggestion," it may be allowed to the reviewer to discuss first the efforts made in his own particular province of medicine. Moreover, very important summaries have been recently made in this country by George Murray²⁹, Hector Mackenzie³⁰, and Shingleton Smith³¹. A perusal of these accounts leaves but one conclusion, an unsatisfactory one, viz., that this disease has so far baffled all efforts to cure or remedy it, by means of the inorganic agents of the pharmacopœia, or even by the various biological derivatives to which so much study has in recent times been devoted. It cannot, therefore, be wondered at if Shingleton Smith, with justifiable disappointment, suggests a return to the treatment of this disease by remedies directed at influencing the neurocardiac mechanism. Hector Mackenzie, with much more conservative tendency, upholds the view that more can be done for the sufferers by open-air treatment, following out plans which savour very much of those in use for the treatment of tuberculosis of the lungs. When possible, he recommends that patients should be sent to places where they can get peaceful and quiet rest, with freedom from noise, and where they can also enjoy pure and bracing air among pleasant and cheerful surroundings. His view that drugs are of quite secondary importance is one which will commend itself to most practitioners, and, in a large proportion of cases, what may be called the **Rest Cure** will do far more for the patient than other methods. Fortunately for the sufferers, there is a large proportion of cases which are little disturbed by this illness, so that special treatment is not called for at all, unless, as is often the case, for what may be called "cosmetic" reasons.

When one makes the effort to bring before readers methods of treatment for the really grave developments which from time to time occur in this malady, the utter inadequateness of all medicinal methods is fully brought home. Iodine preparations, digitalis, nux vomica, phosphate of soda, and a small host of sedatives, including even the most powerful, seem to have little effect upon the maniacal and epileptiform manifestations. It cannot be wondered at, therefore, that physicians turn a hopeful glance to the methods of treatment which have sought to effect a cure by means of experimental **Sera**, and by the use of the tissues of thyroidectomized herbivora. Of all these methods, most attention has been turned to the one initiated by Ballet

and Enriquez, and elaborated by Moebius. So formidable has been the advocacy of the latter well-known authority that the suspicion arises that his plan of treatment has been accepted too readily, as if in sheer despair. The theory of the treatment is plausible enough if we accept the view, by no means proved, that patients suffering from Graves' disease suffer from hyperthyreism, i.e., from an excessive charge of the internal secretion of the thyroid gland. Supposing this were true, and supposing it had been proved that animals mutilated by the removal of the thyroparathyroidal apparatus really did accumulate in their systems toxic substances capable, as it were, of effecting the neutralization of the excessive thyroidal secretion of the sufferer from Graves' disease, much as an acid neutralizes an alkali, then it certainly would be rational to treat such cases with the serum of thyroparathyroidectomized animals. But an examination of both these hypotheses shows that the evidence is too slender, and even what there is is capable of quite different interpretation; the result is that the whole fabric of the treatment by the blood-serum, the flesh, or the milk of thyroparathyroidectomized animals is based upon the flimsiest foundations. It is not, therefore, to be wondered at that different observers have found results quite at variance with one another.

One of the most difficult problems in medicine is, that when once a special form of treatment is initiated, all and sundry, gifted or not with critical tendencies, make use of it, the treatment is given legs as it were, and runs so vigorously that, for a time at least, the mere casual reader is impressed with the importance of the remedy, if for no other reason than that it is so frequently written about. Such a warning is necessary in the case of treatment with the tissues of thyroidectomized animals; and it seems to the writer that it is high time now to cease calling for further use of these remedies. Judging from the trials made up to March, 1905, the writer was quite convinced by the discordant results of such treatment that further application of the remedy was not necessary. Since then, however, reports have been published by Dreyfus³², Arnheim³³, Gevers Leuven³⁴, Delaine and Philippe³⁵, G. Newton Pitt³⁶, Eulenberg³⁷, Christens³⁸, Alexander³⁹, Hempel⁴⁰, Thieniger⁴¹, and Hallion⁴².

Arnheim's contribution may be set aside at once, for he appears to think that the antithyroid serum of Moebius not only neutralizes the excessive discharge into the system of normal thyroid juice, but even if the theory is right that exophthalmic goitre is due to a disordered internal secretion, the same therapeutic agent will still correct any toxic effects produced by such pathologically altered internal secretion.

Gevers Leuven records improvement, but his patient still was very susceptible to psychological disturbance, and with commendable caution he states that a sister of the patient suffering from the same malady had, without any specific treatment, completely recovered.

Delaine and Philippe found that the serum of Moebius brought about an amelioration of all symptoms; but Skansky⁴³, though observing improvement of the symptoms, obtained no cure by this method.

Newton Pitt's good results in six cases are rendered ambiguous by his statements that the cases were also rested in the open air, a treatment which, as above stated, Dr. Hector Mackenzie found efficacious without any specific antithyroid serum.

Eulenberg states that the specific treatment effected, in one of his cases, no change, and in others improvement was only temporary, and concludes that antithyroidin (the blood of thyroidectomized sheep preserved with $\frac{1}{2}$ per cent carbolic acid) has in no wise replaced the ordinary physical and dietetic methods, *but has rather emphasized their necessity*. It is important to remember that both Alexander and Newton Pitt found that excessive doses of such preparation produced symptoms of myxœdema.

Hempel found that his patient, a woman who developed signs of Graves' disease at fifty-four, was successfully treated by means of antithyroidin; but it must be remarked that cases of exophthalmic goitre developing in women who may have had formerly a simple goitre (the Basedowified goitre of the French) have been also reported to do well with treatment by means of thyroid substance.

Hallion reports improvement with a glycerinated preparation of the entire blood (not the serum merely) of thyroidectomized sheep.

The summary that may be made is briefly this: With care these so-called specific substances do not cause any harm to the patient: they appear to relieve some unpleasant symptoms either by suggestion or by the increased care that a new treatment brings in its train, or as a result of the associated more conservative treatment; they do not effect a cure in the complete sense, a result which should not be expected, it must be admitted, even if the hypothesis upon which the treatment is based was at all well established.

Sadger recommends **Cold Applications** to the heart, neck, and back, and cold sitz-baths, as means by which some improvement can be secured for the palpitation, tremor, etc.

Despite the failure of the efforts initiated by Mankowski and by Gontscharukov to develop a serum cytolytic against the thyroid, and which at the same time was not cytolytic against other organs, an effort has been made by Beebe and Rogers⁴⁴ to produce a thyrolytic serum for the cure of Graves' disease. The special feature in this preparation is that animals from which the serum was withdrawn were injected with preparations of the thyroid gland removed from patients who had suffered from Graves' disease. It is well known that it is practically impossible to develop sera which will be specifically cytolytic; such sera produced, say, by the injection of liver substance, are known to be cytolytic against other organs as well. The observations of these two writers, that when sera were produced by the injection of the nucleoproteids of various organs they were much more specific than when prepared from the whole organ, is of little value, for the preparation made by them from the diseased thyroid of Graves' disease contained thyroglobulin. On such confused evidence it seems hardly justifiable to carry out the injection of such sera on human beings, nor are the

cures established sufficiently impressive to justify a continuation of such methods.

SURGICAL TREATMENT.—No physician, considering the inadequacy of the treatment of Graves' disease by drugs, or the serious economical difficulties entailed by such general measures as prolonged rest, etc., can adopt any other position than one of the closest interest in the alleged value of surgical operations for this disease. No doubt, considering the nebulous character of our views of the pathology of the disease, he is biassed largely by the principle that if he can do but little good by measures at his disposal, he must do no harm either. In view of the enormous change of opinion which has followed the brilliant successes of surgical intervention in such a disease as appendicitis, surgeons must confess that the hesitation of the majority of physicians to accept surgical treatment of Graves' disease as a solution of the difficulty must really have some good basis. So far as I can ascertain, physicians and surgeons are almost as sharply divided in their opinions on the value of surgical interference as are the two branches of the healing art themselves.

In view of the great divergency of opinion, it really does not seem out of place to suggest that a contribution should be made by a physician and surgeon on a series of exophthalmic goitre, which, failing to give results by medical treatment alone, were subsequently subjected to the most approved surgical treatment. To suggest such a collaboration is one thing, but to carry it out quite another, for at the outset some very great difficulties would arise. The writer has no doubt that one of the greatest would be the definition of a cure: then, again, the long periods of observation would form a stumbling-block, for a period of two years has been suggested as the interval which must elapse without recurrence of symptoms before a cure by any treatment can be accepted as such. There can be little doubt, too, that there would be great difficulty in diagnosis, for the mere association of tremor, say, and goitre, might provoke quite different opinions. Then, again, as is quite obvious from the reports, the stage at which operation should be performed would cause a difficulty, for some surgeons would recommend operation only in those cases in which some feature of the disease threatens life, as, for example, the pressure on the trachea by an enlarged thyroid; on the other hand, much earlier operation is recommended. The cogent argument, that to operate late when the patient is weakened by the disease is to court disaster, would be dissented from because of the obvious objection that too early an operation carries with it the risk of incorrect diagnosis. A further objection is that, after all, the very large majority of cases are chronic, and really life is not threatened at all. Operation in such cases would be then rather one of expediency and not of necessity, and surgical treatment which, even at the hands of such an expert as Professor Kocher, gives a mortality of 6·7 per cent, is rather too forbidding for a physician to accept. Moreover, were it quite settled what form of operation would be the best to adopt, the physician might the more easily enter into a compact such as has been above suggested.

Even if the less formidable operation of partial thyroidectomy were advocated, the fact that such operation has frequently to be repeated would form a further stumbling-block.

Finally there can be no doubt, that a short cut to a solution of the difficulty by removal of the whole thyroid is quite unjustifiable, for no one can predict with certainty that subsequent substitutional organotherapy would remedy the manipulation of cachexia strumipriva.

It is a matter of singular interest that surgeons in this country have not essayed a publication of an extended list of cases of this disease treated by surgical means. Isolated records are given, too often unfortunate in their results. As a *résumé* of the opinions of our home physicians on the advisability or not of operation, the following may be quoted: Shingleton Smith (loc. cit.) states that the results of surgical treatment, in Osler's words, are "notoriously uncertain." Hector Mackenzie states that thyroidectomy "often fails to cure the disease," and on the whole he considers the risk attending thyroidectomy is too great to justify the adoption of the operation save in exceptional circumstances. G. R. Murray, in almost identical words, states that "the risks of surgical treatment are unfortunately so great that I do not consider partial thyroidectomy is advisable;" two patients upon whom he had "seen this operation performed died within an hour or two." Julius Dreschfeld, in his contribution on some of the symptoms and treatment of Graves' disease, gives no information as to the value of operation beyond a reference to Kocher's list and an account of a case which ended fatally after operation.

So much for the physician's view of the value and safety of operation. I have elsewhere pointed out⁴⁵ that the mortality of cases treated by the more conservative methods according to Buschan⁴⁶ is 11·6 per cent, so that the 10–16 per cent mortality following complete or partial thyroidectomy hardly encourages surgical interference. The imposing figures of Kocher, quoted by Hector Mackenzie, put, however, quite a different complexion upon the problem. The list included 59 cases: 76 per cent were cured; 14 per cent were improved; 3·83 were slightly improved; and, as already stated, 6·7 per cent died. The mortality in Mayo's list of 57 cases was 7, though in the last 23 cases there was but one death; "50 per cent of his cases made an early recovery, and 25 recovered after several months; the remainder were improved, but had occasional relapses of a temporary nature." In the *Annals of Surgery*, December, 1906, Friedheim gives a list of 20 cases operated on by Kümmell at Hamburg-Eppendorf, either by enucleation or resection of a portion of the goitre, or partial ligature of the afferent vessels: 14 cases recovered fully. The intervals which had elapsed in these 14 cases between the operation and the last examination were ten to fifteen years in 5 cases, five to ten years in 7 cases, and four to four and a half years in 2 cases. Five cases had improved by operation. One death occurred, i.e., 5 per cent of the cases operated upon—a result even better than Kocher's. Kocher⁴⁷ more recently reports that out of 1000 operations on the thyroid gland he had only lost

7 cases, 3 occurring in 904 cases of simple struma; the remaining four deaths occurred in operations for malignant goitre and cases of Graves' disease; it is not possible from the account to state how many of the 96 cases which were not cases of simple goitre were cases of Graves' disease. The same observer⁴⁸ also refers to a list of 167 cases of Graves' disease in which he had carried out operative interference. Of the 107 cases of typical Graves' disease, 5 developed tetany but did not die, 8 cases were slightly improved, 10 definitely improved, 56 were cured very largely, and 28 entirely. Of 60 cases of Basedowified goitre, i.e., cases of simple goitre in whom symptoms of Graves' disease ultimately developed, 55 were cured, 4 improved, and 1 developed tetany. Kocher, however, points out the extreme importance of not operating in Graves' disease when the heart has become weakened: blood-pressure observations are essential; general narcosis should not be employed.

Finally, a useful review is given by Dreyfus (loc. cit.) of the results of operation in a collected list of 127 cases. Complete recovery followed operation in 75·7 per cent; great improvement in 2·4 per cent, no improvement in 4 per cent, and death in 7·9 per cent. Only severe cases were operated upon, and in all but 2 cases the period of observation after operation was longer than one year, and in some cases longer than four years.

Such an array of results as this cannot be passed over, and it is the duty of physicians in the future to place before their patients such noteworthy figures. One reserve is necessary, viz., that all cases of Graves' disease should not be subjected to operation, only the graver ones, and Dreyfus gives as indications for operation: (1) Dangerous compression of the trachea; (2) Cases in which the individual is acutely intoxicated; (3) Cases in which there is a sudden increase in the severity of the symptoms, especially in the cases in which the exophthalmos is so great as to endanger the cornea. Excessive tachycardia is rather a contra-indication to operation because of the associated enfeeblement of the heart muscle.

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DUODENUM (Surgery of).

A. W. Mayo Robson, F.R.C.S.

Until quite recently peptic ulcer of the stomach, with its various complications, quite overshadowed the similar conditions in the first portion of the duodenum, and, curious to relate, though we know how common ulcers of the duodenum are, and that they not infrequently prove fatal as the result of hæmorrhage, perforation, or other complications, our increased knowledge of their frequency and importance has chiefly been the result of investigations made during surgical operations for which the term biopsy has been suggested.

It is not so very long since the surgeon, when dealing with an acute abdominal lesion, often deliberately ignored the duodenum, just as formerly he did the pancreas; and, in fact, it may be said that perforated duodenal ulcer is to the surgeon almost the newest of the many possible causes of that hydra-headed monster acute peritonitis, which is now capable of being treated rationally with a reasonable prospect of success.

During the past year quite a large number of cases of operations for perforating duodenal ulcer have been reported in the various journals, as well as a considerable number of cases where gastro-enterostomy has been employed for, and cured, the ulceration, before the advent of more serious complications.

I have personally operated on over 70 cases of duodenal ulcer by posterior gastro-enterostomy without a death, and the ultimate result has been completely curative in over 90 per cent of the cases.

Anomaly of Duodenum.—James G. Mumford¹ has reported an interesting anomaly of the duodenum, which in a case on which he operated is stated to have led to rupture of the stomach at the point of anastomosis after a gastro-enterostomy performed five days previously. The catastrophe was not explicable until the autopsy, when an interesting and significant situation was revealed. The abdominal cavity was found flooded with gastric contents. On carefully exploring the stomach, which appeared contracted nearly to the normal size, a large rent was found far to the left, in the fundus of the stomach. At first it was thought that this must be the perforation of an ulcer, undetected at the operation. It did not seem probable that the anastomotic stoma could be so far from the pylorus; but on further investigation this rent was found to be the stoma, with a portion of the torn-off jejunum attached to its right hand border. The short arm

of this portion of jejunum ran to the ligament of Treitz. It was on the stretch, and measured four inches from the stoma to the ligament.

A little reflection served to explain the rather surprising new arrangement of the parts, and to show what had been going on inside the unfortunate man's abdomen. So long as the stomach remained dilated, the new stoma and the efferent and afferent loops lay in easy relation, and performed their functions. With drainage and rest, however, the overdistended stomach fundus retracted towards a normal position and size. As it retracted, it stretched, and gradually dragged the afferent loop towards the left, until that portion of the bowel found itself drawn tightly between its fixed point, the ligament of Treitz, and its retracting point, the gastro-intestinal stoma. It gave way accordingly at its new attachment, with a result fatal to the patient. In such a case as this, Mumford remarks that it is a lamentable reflection that the more perfect the artificial stomach drainage so much the more rapid is the stomach retraction, and so much the earlier is the fatal result. In another similar case he would perform gastro-enterostomy and entero-enterostomy, with section of the afferent loop between the two anastomotic openings.

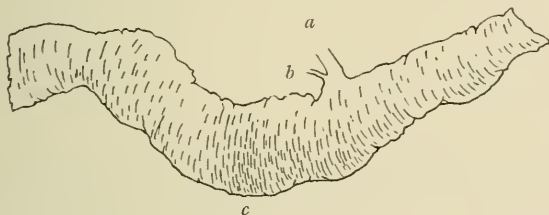


Fig. 18.—*a*, Common duct; *b*, Duct of Wirsung; *c*, Point of greatest development of circular muscle fibres.

From a study of Professor Dwight's paper² it appears that that rather indefinite structure, the ligament of Treitz, may lie in front of the spinal column, or even slightly to its right, in from 10 to 12 per cent of adult cases, a fact noteworthy to surgeons, especially in view of this case.

My own experience of a similar condition has shown me that the posterior operation is safe if the anastomosis is made close to the lower border of the stomach, not too near the cardiac end, and if the jejunal attachment is made three to four inches from the flexure.

Constriction of the Duodenum below the entrance of the Common Bile Duct, and its Relation to Disease.—A. J. Ochsner³ has drawn attention to a dilatation of the upper part of the duodenum, which is commonly present in patients suffering from chronic cholecystitis. He points out that in many patients suffering from gall-stones the vomit invariably contains bile. This he attributes to a development of the circular muscular fibres of the duodenum at a point a little below the

entrance of the common bile-duct. A careful anatomical study of the duodenum has demonstrated the presence of a marked thickening of the intestinal wall at a point 2 to 4 cms. below the entrance of the common bile-duct, which is due to an increase in the circular muscular

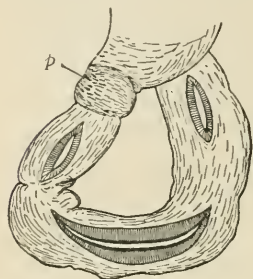


Fig. 19.—*p*, Pylorus. The longitudinal incisions show the relative thickness of the circular muscle fibres between the pylorus and the point of entrance of the common duct; at the point of greatest thickness, 4 cms. below the common duct; and at the point of the duodenum, 15 cms. below this point.

fibres, suggesting that at this point there is a sphincter, the physiological functions of which consist in providing for a means of retaining the chyme in the upper portion of the duodenum, in that it may be voluntarily mixed with the bile and pancreatic fluid.

On many occasions in which I have been operating for gall-stones, and in other operations in the neighbourhood of the duodenum, I have noticed this dilatation of the upper part of this portion of the bowel when the lower part has been empty. The anatomical condition to which attention has been drawn by Ochsner affords an explanation of the condition. The accompanying diagrams are re-drawn from Ochsner's interesting paper in the *Annals of Surgery*.

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DUPUYTREN'S CONTRACTION.

Priestley Leech, M.D., F.R.C.S.

W. W. Keen¹, of Philadelphia, describes an operation which he performed on a case of Dupuytren's contraction of the palmar fascia which had recurred after the ordinary operation. Local anæsthesia was used. The illustration, *Fig. 20*, shows the incision made. The dissection of the flap was begun at the transverse incision corresponding to the knuckles, and was carried down to the sheaths of the tendons. The entire flap was then dissected back, and included on its under surface the entire palmar fascia. This was next dissected away from the under surface of the flap, the fingers of an assistant being on the palmar surface of the skin, so as to warn the operator if he got too close to the skin. Union took place throughout, and when discharged from the hospital the patient had almost normal motion of the fingers.



Fig. 20.—Early stage of Dupuytren's contraction.

REFERENCE.—¹*Amer. Jour. Med. Sci.* Jan. 1906.

DYSENTERY.*J. W. W. Stephens, M.D.*

Amœbic Dysentery.—Rogers and Wilson publish two cases of amœbic abscess of the liver, which were cured by aspiration and injection of **Quinine** into the cavity without drainage. The pus should be examined immediately, and if cocci or bacteria are present, the abscess should be opened; otherwise the authors consider that this method is worthy of trial. The amount of quinine injected is 30 gr. of the bihydrochlorate dissolved in 2 or 4 oz. of water according to the size of the abscess.

J. B. Thomas¹ has tested the effect of a number of chemical solutions on pure cultures of *Entamœba dysenteriae*. Succinic peroxide acid 1-1000, permanganate of potassium 1-2000, sulphate of quinine 1-500, nitrate of silver 1-2000, argyrol 1-500, protargol 1-500, have a very marked deterrent effect on the growth of the cultures within thirty minutes. It is possible then that injections of these solutions may yield equally good results in the treatment of amœbic dysentery.

W. R. Moulden² treats cases of amœbic dysentery with rectal injections of **Sulphate of Copper** (1-10,000). The gut is first washed out with sterilized water until the washings are clear, by means of a tube passed as deeply as possible. The injection is allowed to flow in very gradually from a vessel elevated above the level of the rectum. It can then be easily retained for a space of twenty minutes. The solution should be warm—41°-43° C. (105°-109° F.), and given twice a day at intervals of twelve hours. The author considers it superior to quinine injections.

Sheldon Amos³ in the treatment of dysentery (? variety) finds that mild cases yield readily to four grams of **Sodium Sulphate** administered hourly until a fecal stool is passed. In severe cases the treatment is varied according to the general state of the patient. If the patient is strong enough to withstand the treatment, **Ipecacuanha** is given in the following way. The patient has nothing to eat from midnight till 4 a.m., when 20 drops of laudanum are given, and half an hour later between two and four grams of ipecacuanha in capsules. No food or drink is given until 7 a.m. As the author's patients had an antipathy to milk, a fairly solid diet, consisting of mashed rice, potatoes, lentils, etc., was used with good effect. Brandy and egg is given to those in a very weak condition. The patients sip a 1-3000 solution of lactic acid. In feeble patients **Opium** is strongly recommended. A quarter of a grain of morphine is injected hypodermically, if necessary every four hours. At the same time **Sparteine** or **Caffeine** is injected in order to combat cardiac exhaustion. (See also COLITIS, and SERUM-THERAPEUTICS.)

REFERENCES.—¹Amer. Jour. Med. Sci. Jan. 1906; ²Sem. Méd. (abst). Aug. 1906; ³Lancet, Aug. 1906.

EAR (Diseases of).*James Kerr Love, M.D.*

The Inspection of the Ear in School-children.—The determination of the Government to make the medical examination of school-children compulsory marks a distinct advance in the direction of efficiency in education. It may be well to recall what has been done in recent years

to ascertain the amount of deafness and of ear disease which exists amongst school-children.

Cheatle¹ examined the ears of 1000 children between the ages of three and sixteen years in the Hanwell District School, including the Ophthalmic School. The hearing was more or less deficient in 520 children. In 434 post-nasal adenoids were present, and in 394 of these, some aural trouble was present; in 18 cases foreign bodies were detected. Three hundred and thirty-five were, or had been, the subjects of discharge from the ear; of these, 88 had suppuration going on from one or both ears at the time of the examination, and of these latter, 6 were in need of the mastoid operation.

Murray² examined 400 school-children between six and fourteen years of age. Of these, 43 were found to be deaf, or at the rate of 107½ per 1000.

Rohrer gives the number of deaf children in Switzerland as 117 per 1000. Von Ruckard found 220 per 1000 deaf, and Weil, of Stuttgart, 300 per 1000.

Sir James Crichton-Browne³, in a report presented to the Education Department, shows that mentality or acuteness of intelligence amongst school-children is closely related to the state of the hearing. In a school of 203 children he classified the children into "good," "fair," and "bad." The average mean hearing distance of the bad or very backward children was only half of the normal; of the fair children little more than three-quarters; of the good it was more than five-sixths of the normal.

Armand Levy found that 26.9 per cent of 710 school-children suffered from lesions of the ear and nasopharynx.

Compaired⁴ found that out of 1366 school-children examined by him fully 20 per cent suffer from some ear affection.

In comparing the above results, regard must be given to the class of children attending the schools under review. Many of these schools are attended only by the children of the poorest classes, and the result of the examination in such schools shows the amount of deafness to be greater than the average for all classes, but two conclusions may quite safely be drawn: (1) That in the ordinary elementary schools of the country a large percentage—20 per cent or over—of the children suffer from deafness, and that this deafness is a common cause, probably the commonest cause, of stupidity in school-children; (2) Much of this deafness is due to disease which is curable if treatment be applied in childhood, but if treatment be delayed till later years, cure is difficult, and in many cases impossible.

There can be no more vivid picture of the state of neglect in which the ears of deaf children are left than that seen in the schools for the deaf in this country. To most of these institutions no aural surgeon is attached; in still fewer are the ears of the children systematically examined; and in scarcely any is suppurative disease treated, or are post-nasal adenoids removed, even when these are known to interfere with the speech-training of the children. Amongst the children

resident at the Glasgow Institution for the Deaf and Dumb there are always about 10 per cent who have actively running ears. About ten years ago the writer⁵ ascertained that 70 per cent of these deaf and dumb children had either enlargement of the tonsils, or post-nasal adenoids, or both, and that about 33 per cent had these enlargements in such a marked degree that they should be removed. More recently, when examining 100 children at the Institution with regard to the remaining hearing and speech, the nasopharynx was also examined. Again over 30 per cent were found to have post-nasal adenoids or enlarged tonsils in such a marked degree that the general health, the breathing, or the articulation of these deaf children was interfered with.

At the British Medical Association Meeting (Toronto, 1906) valuable papers were read on the medical examination of children attending the elementary schools. The authors are Helen McMurchie⁶ and William Scott⁷.

Diagnosis in Ear Disease.—Bezold⁸ contributes a paper on the functional examination of the hearing with tuning-forks in monolateral deafness, with deductions on bone-conduction and the function of the sound-conducting apparatus. He founds his conclusions on the examination of cases in which on one side the labyrinth is destroyed, whilst on the other the ear is normal. In a former paper Bezold showed that, in testing the ear without a labyrinth, a difference existed between high and low forks. He showed that within and above the octave a^1-a , hearing which is but the reflex of the other or healthy ear seems to exist for the deaf ear, and this apparent hearing is due to the difficulty of shutting out the healthy ear. The forks below a are not heard at all by the diseased ear. Bezold now offers the suggestion to surgeons that whenever the middle tone of the scale a^1 is not perceived, or only slightly so, and at the same time the lowest part of the scale is found wanting, we may assume deafness; if in middle-ear suppurations the hearing for some of these tuning-forks was previously good, then in case of defect it can be assumed that the suppuration has extended to the labyrinth. As a result of his observations on these cases, Bezold thinks that the assumption that aurally produced sound-waves are directly conveyed to the ear by bone conduction, loses its foundation.

Zimmerman⁹ controverts Bezold's conclusions. He points out that the latter, in using his continuous tone series for the experiments, has compared feeble tones in the deep octaves with strong tones in the high octaves, and that this want of exactness robs the comparisons of their value. Zimmerman further contends, as the result of his observations, that the function of the ossicular chain is not that of a sound-conductor for deep tones, but that it acts as an accommodative apparatus.

External Ear.—Adolph Bronner¹⁰ described a case of *aspergillus* of the external auditory canal, in which the chief symptoms were severe vertigo and frequent attacks of sickness.

Middle Ear.—Selden Spencer¹¹ narrates a case of *aneurysm of the middle ear* with intact drum-head, a condition which he finds but seldom

mentioned in otological literature. The symptoms were slight pain in the right ear, dull headache, gradually increasing deafness, and a gradually increasing pulsation. There was no vertigo. Otoscopic examination showed obliteration of the landmarks on the membrane, which bulged and was of a dull red colour. "Weber" was referred to the affected ear. "Rinne" was negative. Paracentesis was performed, and troublesome bleeding took place, lasting for two days. Internally, potassium iodide and ergot were given, and every second day adrenalin, ergot, and alcohol were injected into the tumour, without, however, producing much effect.

McLeod Yearsley¹² showed a case of *abnormal colouring of the tympanic membrane*. The membrane was of a deep greyish-blue or slate colour, but was otherwise normal. The exact nature of the blue colouring was not determined. An abnormally high jugular bulb seems to have been out of the question. The present writer has seen several cases of blue coloration of the tympanic membrane in coal-miners, and believes the colouring is due to the entrance of coal-dust by the Eustachian tubes. In these cases the membrane has its usual shimmer, and no wiping of the surface removes the discoloration. There may be no symptoms, but deafness and tinnitus are not uncommon.

Cheatle¹³ calls attention to the inefficiency of the means of preventing *injury to the ear during explosions* and other loud noises. The effect of explosions occurring near the ear may be rupture of the membrana tympani, or, more commonly, deafness—more or less permanent—and tinnitus. Cheatle finds the best preventive is a plug of **Clay-fibre** moulded into the external meatus. This is a kind of jeweller's wax, with some fibre intermixed to ensure its withdrawal in one piece. Fleet-Surgeon Lloyd Thomas¹⁴ calls attention to the serious effects of big-gun firing at sea, but does not consider any device has yet been suggested which sufficiently protects the ear from the violent concussion caused by the modern gun. Passow¹⁵ discusses this subject and other injuries to the drum-head in his recently published book.

Richards¹⁶ recommends, after careful trial of all kinds of applications, **Pyoktanin** as the best for the cure of *chronic middle-ear suppuration* in which the radical mastoid operation is not urgently or clearly demanded. He uses 1 part of the drug to 10 of boracic acid, and is careful to point out that the result is not due to the boracic powder. He introduces the powder by an insufflator, or if the perforation be small, on the tip of a moistened probe, after the ear has been thoroughly cleansed. The drug can also be used in solution. The chief objection to it is the persistent blue colour it gives to the subsequent discharge, a colour which may last for days or even weeks. Of 36 cases subjected to the pyoktanin treatment, 4 were not improved at all, 14 were improved, 16 were cured, and 2 were improved for some months, then relapsed, and had to be treated by ossiculectomy.

At the writer's clinic at the Glasgow Royal Infirmary, pyoktanin has been extensively tried, and has not given very encouraging results. In several obstinate attic cases, **Cyllin** (creolin)—1-400—has been followed by good results. The solution is introduced by means of an intratympanic syringe through the perforation in the membrana tensa, and the attic or aditus is afterwards carefully dried by means of bent cotton tips.

Hamm¹⁷ advises, as an artificial membrane, **Paraffin** having a melting point of 45° C. The edge of the perforation is cocaineized and dried off; the aperture is then covered with a piece of sterilized gauze which has been dipped in paraffin, and is gently pressed into place. The paraffin hardens in a few moments, and effects an air-tight and water-tight closure of the opening, so that the patient may bathe without danger. If the artificial membrane has been applied prematurely, and suppuration continues, the secretion readily loosens the paraffin, and the latter is expelled with the discharge.

Mastoid Surgery.—Knapp¹⁸ thinks the views of surgeons regarding the mastoid operation tend to greater conservatism. He puts aside the cases of chronic purulent otitis where intracranial complications, stenosis of the canal, and acute mastoiditis are present, as cases in which the wisdom of operation is self-evident; and then, following the classification of the Berlin Ear Clinic described by Heine, he divides the cases of chronic purulent otitis into dangerous and non-dangerous. In the former, the bone is affected, especially in the attic and antrum; in the latter, the inflammation is more localized to the mucous membrane of the tympanum, a region from which intracranial complications rarely ensue. He thinks the bone likely to be involved when the discharge has fœtor, when the perforation is marginal towards the posterior wall, and the annulus is eroded. Knapp thinks the probe is of little advantage in diagnosis. He thinks the presence of cholesteatoma, unless where the opening of the cavities is into the middle ear, is an urgent reason for operation. Amongst symptoms which may raise the question of operation, Knapp mentions headache, nausea, and vertigo. The presence or aggravation of these symptoms, with a cessation of the discharge, points to the retention in the accessory cavities, and usually necessitates operation.

The writer had a very unfortunate experience in this connection recently. A lady who had the Schwartze operation done ten years ago for acute mastoiditis, came under his care eight or nine years ago, and was more or less continuously under treatment till last year. During these eight or nine years there was no entire cessation of discharge, although at times it was very slight. For a year or two, however, headache and giddiness, associated with lessening of discharge, had become increasingly troublesome. These symptoms were relieved by the coming away of discharge in greater quantity. There was clearly retention, and at the patient's request the writer operated. The external and posterior semicircular canals were found open and eroded, very little discharge was found in the antrum, and the radical

operation was completed in the usual way. The canals were not interfered with, and no other diseased bone was found bounding the temporosphenoidal or cerebellar fossa. But the patient died in less than a fortnight of a metastatic meningitis, affecting chiefly the anterior part of the brain, and at the post-mortem examination no evidence of disease of any kind could be discovered, either on the upper or posterior surface of the petrous portion of the temporal bone. Indeed, there was no evidence of disease within the skull near the seat of operation at all.

Whilst a case like this causes the careful operator to pause and reconsider his position with regard to the operative treatment of non-urgent cases of chronic middle-ear suppuration, the writer thinks he was justified in operating in the circumstances above detailed, and would lay down the rule as to practice as follows:—Unless he can practically exclude infection of the attic and antrum in a case of middle-ear suppuration, there is less risk with the radical mastoid operation than without it.

Knapp expresses his views on the indications for the radical operation as follows:—The operation is not indicated when the tympanum, and especially its mucous lining, is involved, because intracranial complications are not likely to ensue, and the operation usually accomplishes nothing. The operation is urgent when the symptoms of headache, nausea, and vertigo are associated with, and in relation to, chronic purulent otitis; where the bone is found affected or cholesteatoma is present, and these symptoms are not promptly relieved by minor operation. The operation is indicated when the signs of bone involvement continue after conservative treatment has been followed for a certain length of time, and the odour of the discharge persists. The operation is not necessarily urgent in these cases, if good drainage is present. The question of operation then depends on the patient's wishes and the condition of the hearing in the other ear.

Knyvett Gordon¹⁹ gives some further experiences of the operative treatment of *scarlatinal otitis*. His practice is to treat such cases without operation for a period ranging from one to three months. Following this plan, he found that 15·6 per cent required operation. He prefers the radical operation in these cases to a mere opening of the mastoid cells and antrum, because it gives a better result with regard to hearing, and is more generally followed by an entire cessation of discharge. He emphasizes the fact that in scarlatinal otitis we have an infection of the whole tract from the Eustachian tube to the mastoid cells, accompanied by a definite osteitis where that tract is bony, and not a simple catarrhal inflammation of the lining membrane of the tympanic cavity.

Heath²⁰ contributes a paper on his modification of the mastoid operation as a means of curing chronic suppuration of the middle ear without removal of the drum (membrane), or ossicles, or the loss of hearing. The original paper was read before the Otological Society

on December 5th, 1904. Heath further describes his operation, and shows that, in the ten cases in which the modified operation was performed, hearing has improved.

Otosclerosis.—At the May meeting of the Otological Society of the United Kingdom, the subject of discussion was fixation of the stapes²¹. Urban Pritchard referred to the various causes of such fixation in suppurative and non-suppurative disease, but the discussion centred round that form of fixation in which there is no gross middle-ear disease, but in which the fixation is associated with bony growth in the labyrinth capsule—otosclerosis. Urban Pritchard suggests the making of a new fenestra where the fenestra ovalis has been rendered useless. Later in the discussion it emerged that this had been done by Milligan and West without any good result.

The disease has been supposed to spread from the middle ear as an inflammatory action (Hebermann, Katz, Scheibe). Another theory is that the disease is the last phase in the general development of the body, and arises in the layer of cartilage which lies between the original labyrinthine capsule of early life and the bone which is formed in the connective tissue of the skull, and which ultimately surrounds the true capsule. Politzer thinks the disease is a true osteitis. Gray thinks that the essential pathological basis of the disease is the death of circumscribed portions of bone and cartilage, followed by the absorption of the same portions, and by the deposits of new spongy bone to take the place of the bone or cartilage which has been absorbed.

Milligan²² calls attention to the *influence of pregnancy and parturition* upon certain forms of progressive deafness. Every aurist knows how, especially in otosclerosis, every pregnancy means an accession to the amount of deafness already existing; and the points which Milligan raises are: (1) The advisability or otherwise of young women already the victims of advanced chronic middle-ear catarrh, purulent or non-purulent, or of otosclerosis, entering into matrimony; (2) If marriage has already taken place, and the existing deafness has been materially increased by a first pregnancy, the advisability or otherwise of suggesting means to prevent any further pregnancy; and (3) In a case of advanced deafness, where previous pregnancies have invariably increased the existing deafness, and where the patient is again pregnant, whether it is advisable or justifiable to induce premature labour.

Lake²³ gives a case of operation on the vestibule for the relief of *vertigo*. He uses a special flap operation on the soft parts to give very free access to the petrous portion of the temporal bone. He describes the bone operation as follows:—After exposing the bony semicircular canal, its upper surface is cut away with the electric burr until the membranous canal is opened. This canal is then followed up anteriorly and posteriorly to the entrance into the vestibule. Then, by means of a small chisel, these two openings are connected by cutting away the intervening bone. Having once obtained a wide entry into the vestibule, the whole of its upper surface, or the vestibular roof, is

rapidly removed in such a way as to expose the entrance to the posterior ampullary dilatation. All of the exposed parts of the vestibule and ampullæ are carefully curetted with a fine curette. The next step is to see that thorough drainage is afforded to the small bone-locked cavity, which is done by removing the foot-plate of the stapes. This completes the operation, the facial nerve, sheathed in bone, lying between the openings into the vestibule.

W. S. Bryant²⁴ discusses the propriety of dividing the eighth nerve in such troublesome cases of vertigo as suggest the need for operation, and though he seems never to have done the operation except on the cadaver, approves of its performance where we are convinced the cause of the tinnitus is disease of the peripheral portion of the auditory nerve. It seems to the writer that Lake's procedure is much less risky than section of the eighth nerve, and quite as likely to do good.

Intracranial Complications of Ear Disease.—Eagleton²⁵ relates a case in which the circulatory disturbances following ligation of the internal jugular vein in sinus thrombosis caused, in his opinion, the death of the patient. Two symptoms were present in his case which he thinks pointed to venous "storing" in the brain, viz., severe bleeding from the diplöic veins, and optic neuritis. These symptoms, occurring after ligature, point to insufficient outflow from the jugular of the other side. If optic neuritis be already present in a brain case, he thinks we should be very careful not to add to this obstruction by further surgical manipulation. Eagleton thinks we should, before tying the internal jugular, (1) Freely incise the sinus wall, and avoid the possibility of mistaking a parietal for an occluding thrombus; (2) Try temporary compression of the vein by a clamp, and see if it causes extra bleeding from the diplöic veins; (3) Tie above the entrance of the facial veins; (4) Not injure the external jugular vein.

Richards²⁶ contributes a long paper on infective sinus thrombosis. He says, "When operating on cases of mastoiditis in which symptoms of septic absorption pointing to sinus thrombosis are present, we will find it to be conservative practice to open the vessel regardless of its appearance, of its feel, or of its pulsation; or again, if during the mastoid operation we expose a sinus which, upon careful examination, seems suspicious, we should open the vessel regardless of the lack of symptoms." If the environment has been carefully cleansed, Richards thinks the risk attending the opening of the sinus is almost nil, whilst if we wait for symptoms, such as chill and high temperature, we have then to deal rather with the breaking down of a "thrombosis" than with a "thrombosis" itself, and that operation on the sinus and vein will probably be too late.

Kerrison²⁷ discusses Richards' paper, and differs from him. Kerrison says, "I believe (1) That the sinus should only be opened in the presence of symptoms or physical signs pointing fairly definitely to intravenous involvement; and (2) That to advise opening the sinus in spite of the absence of symptoms in all cases in which the surgeon suspects the existence of a clot, without any definite statement

as to the exact signs justifying such a suspicion, is an inexact and unscientific method of expression which should not find a place in otological literature." Kerrison's convictions are:—

1. In operating upon a patient suffering from acute or chronic mastoiditis (with chills, fever, sweating, etc.), the lateral sinus should be exposed for at least three-fourths of an inch, but that if the sinus be compressible and the dura healthy, the vessel should not be opened.

2. Should symptoms of septic absorption develop in the post-operative period following mastoidectomy, the indications are the same, i.e., free exposure and careful examination of the sinus.

3. In operating upon cases of extensive mastoid necrosis, one not infrequently finds the sinus groove diseased and the sinus wall thickened and covered with granulations. In the absence of symptoms of sepsis, this condition should be regarded as a positive contra-indication to opening the sinus. The granulations should not be curetted. The sinus wall should not be subjected to any unnecessary manipulation.

Another interesting paper on this subject is contributed by Allen Starr.²⁸

Bacteriology of Ear Disease.—Preysing²⁹ has published a work on this subject. It deals with the examination of 100 infants, ranging from one day to three years, the average age being about seven months. The post-mortem examination shows that, in 154 ears which were diseased, the infection was a pure pneumococcus in 96, a mixed infection with the pneumococcus in other 16, pure streptococcus in only 1, *Staphylococcus pyogenes aureus* in 3, mixed staphylococcus in 5: 33 ears out of the 154, although showing signs of inflammation, were sterile. Preysing's book takes the form of an atlas, and the pathological conditions present are shown in 40 microphotographs.

REFERENCES.—¹*Trans. Otol. Soc.* 1902, p. 74; ²*Ibid.* p. 89; ³*Ibid.* p. 93; ⁴*Canad. Jour. Med. and Surg.* Nov. 1905; ⁵*Deaf Mutism*, Kerr Love, 1896; ⁶*Brit. Med. Jour.* Sept. 22, 1906; ⁷*Ibid.*; ⁸*Arch. Otol.* vol. xxxv. p. 214; ⁹*Ibid.* p. 222; ¹⁰*Jour. Laryng.* Feb. 1906; ¹¹*New York Med. Rec.* Mar. 17, 1906; ¹²*Jour. Laryng.* Mar. 1906; ¹³*Ibid.* Jan. 1906; ¹⁴*Med. Rec.* Oct. 14, 1905; ¹⁵*Injuries of the Ear*, Passow, Wiesbaden, 1905; ¹⁶*Laryng.* Sept. 1905; ¹⁷*Deut. med. Woch.* Feb. 22, 1906; ¹⁸*Arch. Otol.* April, 1906, p. 111; ¹⁹*Jour. Laryng.* June, 1906; ²⁰*Lancet*, Aug. 11, 1906; ²¹*Jour. Laryng.* May, 1906; ²²*Ibid.* June, 1906; ²³*Lancet*, Jan. 6, 1906; ²⁴*Jour. Amer. Med. Assoc.* Dec. 1905; ²⁵*Arch. Otol.* vol. xxxv. p. 91; ²⁶*Ibid.* vol. xxxiv. p. 378; ²⁷*Ibid.* vol. xxxv. p. 20; ²⁸*Med. Rec.* Mar. 10, 1906; ²⁹*Otitis Media der Säuglinge*, Preysing (Bergman, Wiesbaden, 1904).

ECZEMA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

In opening a discussion on eczema at the Toronto meeting of the British Medical Association, Chambers¹ enunciated some rather heterodox views on the etiology of the disease. He holds, for instance, that there is a special diathesis, and quotes Bouchard and Landouzy as believing that its basis is a sluggishness of nutrition, which the latter calls bradytropy. Tuberculous patients, Chambers thinks, rarely

suffer from eczema, and he has observed asthma and eczema often occurring together, the latter being very difficult to cure. Again, "it is very common to observe a rapid increase in weight concomitantly with the appearance of eczema; and according to my experience, a diminution in weight in these patients facilitates treatment." Even in traumatic eczemas he maintains that there is a predisposition.

Washing he considers harmful in eczema, since it removes the fibrinous exudate, and subsequently the skin gets crusted and cracks appear, but aqueous fluids have a good effect when applied continuously, and he uses **Normal Saline Solution** on cheese cloth kept moist by gutta-percha tissue. As soon as the skin, by its colour, smoothness, the absence of crusts, etc., shows diminished inflammation and improved keratinization, he discontinues the dressing and applies **Lassar's Paste**.

MacLeod² considers that all are agreed as to an existing idiosyncrasy in these cases, but whether the irritant is external, or internal from toxins, is still undecided.

Most French writers lay stress on the causative effect of disturbances of nutrition. Variot³, discussing infantile eczema, says that all manifestations are preceded or accompanied by digestive trouble, vomiting, diarrhoea, constipation, etc., all pointing to intestinal toxæmia. Too rapid a cure must be avoided, in case the disease reacts on the nervous system and causes sudden death, with cerebral symptoms; therefore he uses weak remedies. **Moist Dressings, Baths, and Zinc Ointments** are his weapons, and he avoids treating too extensive an area at once. He restricts the diet: most infants are overfed; and he prefers **Magnesia** and **Castor Oil** to such intestinal antiseptics as salol and Betanaphthol, which in his opinion are irritating and should not be so frequently used. In serious cases he advises **Lavage** of the colon with decoction of **Marsh mallow**.

Lesne⁴, believing in the same theory of internal causation, treats his patients by feeding on **Buttermilk**. Four patients varying from thirteen months to two years of age were treated in hospital and cured by this means in a few days. Eight infants under one year were treated at their own homes with similarly successful results.

Legrand⁵, while insisting on a milk and vegetable diet and the avoidance of greasy and irritant foods, such as sauces, pork, game, fish, cheese, or wine, also applies external remedies. His external treatment is very similar to the usual methods:—

1. Congestive period: Powders, such as **Bismuth** and **Zinc**.
 2. Crusted period: **Starch Poultices, Moist Dressings**, or bathing with hot infusions of **Elderflowers** or **Chamomile**.
 3. After the crusted period: **Lassar's Paste** without salicylic acid, or **Unna's Paste**, viz., benzoated lard 28 parts; talc 2 parts; oxide of zinc 10 parts.
 4. Subacute and chronic period: **Salicylic, Resorcin, or Pyrogallol Ointments, or Glycerin of Starch** with **Ichthyol**.
 5. Rebellious cases: **Nitrate of Silver**, 1 to 10 per cent painted on.
- Schwarz⁶ considers that most of the ordinary bases used in ointments

are either chemically unsuitable or the skin surface is too sensitive. Animal fats are excellent when fresh, but when rancid become irritant. Inorganic fats do not decompose, but their constituents are injurious to many skins. Other desiderata of a base are that it should be capable of taking up a drug and of distributing it regularly. He first mixed lanolin, glycerin, water, and egg in emulsion with other fats, but this tended to separate, and finally he superfatted with milk, and this preparation, called "**Mitin**," has the properties that it combines readily with other drugs, is readily absorbed, is clean and not greasy. It is put up in 30-gram tubes ready for use. He has successfully used it in four cases of eczema as well as in other skin affections.

Carle⁷ finds **Tumenol** very useful, but it is necessary to use it with judgment. At the commencement, when the disease is characterized by congestive plaques, vesiculation, and itching, swabbing with a solution of tumenol powder soothes the pruritus, but all the other non-irritating dressings produce this same effect. In the second period when vesicles are prominent and the pruritus and congestion have diminished, tumenol is the drug to select, but must be used weak as a paste—not as an ointment. In the third period, when there is persistence of crusts and oozing, the remedy used as a lotion or ointment modifies the abnormal keratosis. Lastly, if lichenification supervene, it may be necessary to strengthen the effect with drugs having a more powerful keratolytic action.

Joseph⁸ (see under ACNE) extols the value of **Pittylène** in subacute and chronic cases, as also in the impetiginous eczemas of children :—

R	Pittylène	2-10 parts	Starch	āā 25 parts
	Oxide of Zinc		Fètron	ad 100 parts

Or,

R	Pittylène	5-10 parts	Starch	āā 20 parts
	Oxide of Zinc		Distilled Water	ad 100 parts

In more thickened patches it is best used as a 10 to 60 per cent plaster.

Otto Meyer⁹ has treated a series of cases of eczema with '5 to 1 per cent of **Picric Acid** added to **Lassar's Paste**. The best results were obtained in seborrhœic eczema over the joints, but tar was necessary to complete the cure. No toxic symptoms occurred, but he carefully considered the condition of the digestive and urinary tracts before beginning treatment. Healthy parts were protected with vaselin to avoid staining.

Weisz¹⁰ finds in **Empyroform** a drug which suits all stages of eczema and does not irritate like tar ; it is light brown in colour.

R	Empyroform		Vaselin	
	Oxide of Zinc	āā 2·5-5 parts	Lanolin	āā 25 parts

Or,

R	Liniment. Exsiccons (Pick)		Empyroform	2·5-10 parts
		50 parts	Lanolin	1·5 part

or it can be painted on in 2 per cent chloroform or acetone solution.

Schmidt¹¹ rightly asserts that X rays should only be applied to chronic cases, and are not suited for acute ones. He has never found the rays do good in leg cases where the circulation is faulty, and on the scalp they are contra-indicated because of the possibility of alopecia. They are especially indicated in: (1) Anal and genital eczemas with much irritation; (2) Hyperkeratotic, rhagadiform, dry or moist eczema of the hands; and (3) Chronic lichen. The irritation may not be alleviated for eight days, and the patient should be warned of this, and also that it may become temporarily worse. As regards the permanency of the results, this is most marked in hyperkeratotic eczemas of the hands. Other forms may show relapses, but they usually yield to repeated treatment.

The advantages claimed are that: (1) The treatment is convenient, as for instance when the hands are affected, ointments are superfluous, and the patient can go on with his ordinary work; (2) Recovery ensues in a shorter time; (3) The treatment is often effective in old obstinate cases which do not respond to other methods. Out of 83 cases, 45 recovered, 14 were improved, and in only 7 did no benefit ensue; 17 left before the completion of the treatment, and in 22 cases relapses recurred.

REFERENCES.—¹*Brit. Med. Jour.* Oct. 6, 1906; ²*Pract.* July, 1906; ³*Gaz. d. Hôp.* July 14, 1906; ⁴*Sem. Méd.* Dec. 20, 1905; ⁵*Gaz. d. Hôp.* June 12, 1906; ⁶*Méd. Press.* Aug. 1, 1906; ⁷*Lyon. Méd.* Nov. 5, 1905; ⁸*Derm. Centr.* 1905, No. 3, p. 66; ⁹*Ther. Monats.* 1905, No. 5, p. 221; ¹⁰*Ibid.* Jan. 1906; ¹¹*Zeits. f. Diät. u. Phys. Ther.* June, 1906, ref. in *Brit. Med. Jour.* Sept. 15, 1906.

EMPYEMA (Chronic).

Priestley Leech, M.D., F.R.C.S.

Ransohoff, of Cincinnati¹, advocates **Dissection of the Pleura** in the treatment of chronic empyema in place of decortication of the pleura. A perusal of the cases reported makes it evident that in many cases insurmountable difficulties are met with in any attempt at a complete decortication. If an incision is made into the thickened pleura until the lung tissue is reached, as is evidenced by the bluish tint in the floor of the cut, the incision widens out until the cut becomes a groove. Dissection of the pleura consists in gridironing the pulmonary pleura with many parallel incisions removed from each other about a quarter of an inch, and of crossing these obliquely or at right angles with other parallel cuts. Little islands of thickened pleura are thus left on the surface of the expanding lung. The hæmorrhage is slight and easily controllable.

A further step towards liberating the lung is an incision carried cautiously through the length of the groove or angle of reflexion of the costal and pulmonary pleura. In large cavities the line of reflexion is not easily found. If the incision be limited to the costal part of the gutter and carried towards the chest wall, there is no danger of wounding large vessels, or of opening the sound pleura above.

REFERENCE.—¹*Ann. Surg.* April, 1906.

ENEMATA (Nutrient). (*See* RECTAL FEEDING.)

ENURESIS.

Prof. G. F. Still, M.D.

According to Thursfield¹, incontinence of urine becomes abnormal after the age of two years, and a well-trained infant can retain control of its urine during a sleep of eight to ten hours. Enuresis occurs most often between three and ten years of age, and occasionally persists into adult life. Girls are affected twice as often as boys. Occasionally the incontinence begins in early adult life. Usually the bladder suddenly empties itself, but in rare cases there is a constant slight leakage.

Before attempting to treat any case, care must be taken to ascertain as far as possible the cause of the enuresis. Thursfield considers that the commonest cause is adenoids, and that the removal of the hypertrophied adenoid tissue is the first essential step in the cure of the enuresis; it must, however, be pointed out that other observers have held a different opinion, and regard the removal of adenoids as having little or no influence upon enuresis. A more potent factor probably is that mentioned next by Thursfield, namely, presence of thread-worms. Small anal fissures, vulvitis, and phimosis are all stated to play some part in the production of enuresis, but with very little evidence. Hyperacidity of the urine, which is often associated with passage of uric acid and high concentration of the urine, may cause enuresis; certainly in some cases large doses of alkali quickly cure incontinence. The presence of bacteria in the urine seems to be the cause sometimes, although no cystitis is present and thus bacteriuria is often overlooked.

In any case of incontinence of urine, the possibility of epilepsy must be remembered; the bed-wetting may be the only evidence, or there may be slight attacks of *petit mal* at other times which may give the clue to the cause of trouble. In rare cases enuresis may depend upon organic disease of the kidney, as in a case recorded by Bazy², where a girl aged sixteen passed large quantities of urine at night and had enuresis, and subsequently was found to have tuberculosis of the kidney.

TREATMENT.—Zangger³ lays stress on the need for moral treatment; the confidence of the child must be gained, and his *amour propre* utilized. He must not be laughed at or punished for his weakness, but encouraged in every way to conquer his weakness by his own will. He should lie on a hard bed at night, sleep lightly covered, and lie on his side. The end of the bed should be raised slightly, so as to raise the pelvis to a slightly higher level than the shoulders. The child should be awakened twice in the night to micturate, and in the morning he should have a cold bath combined with a cold douche to the back. As to diet, meat, eggs, milk, vegetables, and fruit should be the staple food; condiments and salty foods should be avoided. In order to keep the bowels working regularly, apples, pears, oranges, dates, figs, etc., should be given for breakfast and lunch. For local treatment, massage of the sphincters is recommended by Zangger.

Thursfield (loc. cit.) considers sweets to be most potent causes of relapses, and prohibits tea, coffee, and sugar in all its forms. He does not find it necessary to eliminate meat from the diet, nor does he limit the amount of fluid taken by the patient except at the latest meal; indeed, he would allow the child to drink as much water or milk as it likes, provided it is taken at regular times, for he thinks the limitation of drink may cause concentration of urine, and so aggravate the enuresis. Nervous, excitable children should be kept away from school for a time, and the general hygiene in the way of fresh air and exercise must be regulated. Lewis⁴ holds that abstinence from meat is decidedly useful in cases where the night urine is concentrated and very acid; while in other cases, where the urine is of low specific gravity and neutral or alkaline, all farinaceous food should be stopped. He holds that enuresis is usually the result of intestinal sepsis, and would give **Calomel** gr. $\frac{1}{4}$ every night, followed by a mild saline aperient in the morning, and in many cases would give also some preparation of **Iron** or **Nux Vomica**.

Most clinicians have found **Belladonna** useful in some cases. Lewis considers that in small doses it acts as a "tonic to the nervous system;" and when given in semi-poisonous doses it acts on the mind, and is then successful by diverting the attention; he quotes Founsagrives as holding that belladonna makes sleep less profound and so allows control of the sphincter. Thursfield begins with tincture of belladonna 10 min. three times a day, and increases the dose gradually up to a drachm three times a day. The dose must be very gradually diminished after the enuresis has ceased: and for permanent cure, a course of treatment extending over 3-6 months will usually be required. **Potassium Citrate** is occasionally efficacious in cases where there is hyperacidity of the urine. **Urotropin** was successful in 9 out of 30 cases. Ullman⁵ recommends fluid extract of **Rhus Aromatica** in doses of 5 drops three times a day for infants, while for older children he uses **Atropine** one grain in two ounces of water; of this solution, five drops to be given at 4 p.m., 7 p.m., and 10 p.m. Etterlen⁶ records success with **Boric Acid** in doses of $7\frac{1}{2}$ gr. three times a day. If drugs fail, **Electrical Treatment**, with one pole over the pubes and one on the lumbar region, is worthy of trial: and as Thursfield points out, a removal to unfamiliar surroundings, with rest in bed, is sometimes more effectual than any other treatment.

REFERENCES.—¹*Pediatr.* Sept. 1906, p. 556; ²*Brit. Jour. Chil. Dis.* April, 1906, p. 166; ³*Ibid.* July, 1906, p. 325; ⁴*Pediatr.* Sept. 1906, p. 564; ⁵*Arch. Ped.* Mar. 1906, p. 239, ⁶*Ther. Monats. in Arch. Ped.* Mar. 1906.

EPIDERMOLYSIS BULLOSA HEREDITARIA. *Norman Walker, M.D.*
Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Agnes Savill¹ reports two cases, in a brother and sister. (1) A woman, aged twenty-six, had bullæ at three years of age, and has been affected more or less since, principally on the legs; when reported, the armpits and shins were the seats of the eruption. There was no itching: the condition was always worse in summer. Slight pressure

did not cause the production of a bulla, but friction, especially in warm weather, did so. She was treated with **Ergot** with great benefit : (2) Her brother, aged forty-four, developed the condition when a month old, and the legs had never been free for many years except for a few weeks in winter. He also was the better for ergot.

Berger² mentions the case of a child where the disease had lasted for six years, and when all other methods had failed, exposure to X rays for seven minutes was followed by improvement in three days, while subsequent exposures were followed by complete cure.

REFERENCES.—¹*Lancet*, July 14, 1906 ; ²*Sem. Méd.* May 16, 1906.

EPILEPSY.

Purves Stewart, M.D.

Amongst recent papers on the pathological anatomy of epilepsy, one of the most interesting is that of J. Turner¹, whose results are based on the examination of a large number of epileptics in asylum practice. Most of the patients, however, were idiots or imbeciles, and this fact must be borne in mind in estimating the true value to be attached to his most interesting researches.

Turner holds that epilepsy is a disease occurring in persons with a defectively-developed nervous system : that it is associated with a morbid condition of the blood, one of whose features consists in a special tendency to intravascular clotting ; and that the immediate cause of the epileptic fit is a sudden stasis of the blood-stream in the brain, resulting from the blocking of cerebral vessels by these intravascular clots.

Epilepsy, according to Turner, does not consist merely in fits, since fits may be entirely wanting through the whole course of a case. The symptoms consist partly in fits, major or minor (a recurrent but transient element), and partly in a permanent underlying condition (the peculiar epileptic character of the patient), representing the sequelæ of chronic diseased conditions in the brain.

In support of the first part of his thesis, that epilepsy has an underlying defective development of the nerve-elements, Turner describes the persistence of an embryonic form of nerve-cell in the epileptic brain. This he admits to be common in imbeciles, whether epileptic or not. He also describes the persistence in the epileptic brain of subcortical nerve-cells. Normally, these subcortical cells disappear by the time adult life is attained ; but in imbeciles and epileptics they persist in large numbers.

The second part of his thesis, referring to the occurrence of clotting in the cerebral vessels, he supports by a large number of pathological observations. He also refers to the fact that in rabbits general convulsions can be produced by the ligature of the left subclavian and innominate arteries, whilst in man compression of both carotids not infrequently produces epileptiform fits. Further, Leonard Hill², the eminent physiologist, has produced spasm in himself by compressing one of his own carotids.

For many years it has been recognized that the cortex of the cornu

ammonis is markedly sclerosed in many epileptic brains. This sclerosis Turner shows to be due to overgrowth of neuroglia, with secondary atrophy of the nerve-cells. He ascribes it to deprivation of the normal blood-supply to the parts, whereby the tissues are, as it were, starved.

Summing up, Turner concludes that the pathological basis of the epileptic fit is to be sought in the presence of defectively developed and probably unstable nerve-cells, together with a local stasis of the blood-stream resulting from intravascular clotting.

TREATMENT.—Modern treatment no longer consists in a routine drugging with one or other of the bromides. As Spratling³ has said, the time has gone by when we speak simply of "epilepsy;" we must speak of "the epilepsies," for epilepsy is a syndrome which may be due to various causes. Some cases are due to gross brain lesions, others to finer organic cell changes, such as have been recently described by J. Turner (to which we refer above); other cases again may be due to toxic or metabolic causes, others to variations in the intracranial circulation; and in every epileptic, it is the duty of the physician to try and discover which of these factors is present. Treatment by **Bromide Administration** is but palliative, at the best; bromides, properly administered, may arrest the attacks for shorter or longer periods, but they do not of themselves cure the disease. Matthew Woods⁴ emphasizes the desirability of diluting them with large quantities of water, as much as half a pint or more at a time.

Whilst, therefore, not neglecting the proper use of bromides, we must attend to other factors of equal importance in treatment. Amongst these the **General Mode of Life** should be regulated. Excitement, excess, overstrain (mental or physical), must all be avoided. Chronic epileptics are much better treated in epileptic colonies than in their own homes, not only in the case of poorer patients where constant supervision at home is unattainable, but even in well-to-do patients. A well regulated régime, the provision of some regular occupation and of a proper education, are more easily attainable in special institutions.

DIETETIC REGULATIONS.—In former volumes of the *Medical Annual* I have discussed the value of a **Diet Free from Sodium Chloride**, or common salt, and pointed out how under such a régime a smaller quantity of bromide is efficient in controlling the fits. Further experience has corroborated these views. In addition, the avoidance of purin-containing articles of diet has been shown to have a beneficial effect. Thus Aldren Turner⁵ states that with a **Purin-free diet**, a single dose of bromide, perhaps no more than 20 or 25 grains at night, may be successful in diminishing the fits in cases where large doses of bromides, administered without dietetic precautions, had failed. The patient is instructed to live as far as possible on the following purin-free articles: milk, eggs, butter, cheese, rice, macaroni, tapioca, white bread, cabbage, lettuce, cauliflower, sugar, and fruit. The following food-stuffs have only a small proportion of purins, and may sometimes be allowed: pea-meal, malted lentils, potatoes, and onions. On the

other hand, the following purin-containing bodies are excluded: all kinds of fish and flesh, including sweetbreads; tea, coffee, and cocoa. If any meaty foods are allowed—and it is difficult to get an epileptic patient to persevere for prolonged periods on a vegetable diet—the least harmful of the group are tripe, cod-fish, and neck of pork. (See also DROPSY, for chloride-free diet; and GOUT, for purin-free diet.)

Rosanoff⁶ records some interesting observations made by him which go to show that the important dietetic factor is not merely the avoidance of meat as such, but the avoidance of proteid in any form, whether animal or vegetable. Therefore epileptic patients should have a diet containing as large an amount of carbohydrates and fats as they can assimilate, and the smallest amount of proteid compatible with the maintenance of nitrogenous equilibrium, whether that proteid be of animal or vegetable origin.

REFERENCES.—¹*Brit. Med. Jour.* Mar. 3, 1906; ²*The Cerebral Circulation*, 1898; ³*Med. Rec.* Dec. 30, 1905; ⁴*Med. Rec.* Dec. 30, 1905; ⁵*Pract.* 1906, p. 545; ⁶*Jour. Nerv. and Ment. Dis.* Dec. 1905.

EPITHELIOMA OF THE SKIN.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Hirschberg¹ narrates an interesting personal experience. He had on the helix of his right ear a growth, 1.5 cm. long and .5 cm. broad, which was about to be excised, when he had, for other reasons, to go to a mountain health resort, where he was lucky enough to experience four weeks of bright sunshine. On the tenth day it was blistered, and when the slough was removed it was much improved. The **Sunlight Treatment** was continued, and on returning home there was only a patch the size of a pinhead, which caustic potash took away. Eight months later there was no recurrence.

Robinson² considers that the treatment depends on the characteristics of the eruption, but should be directed to complete and thorough removal, with as little deformity as possible. The Röntgen rays are, he avers, too much used. Macleod³ reports the case of a woman of thirty-four who had a severe reaction after X-ray treatment of her lupus, followed by the development of an epithelioma. He quotes Da Costa as having reported 7 cases out of 72 so treated.

Harlingen⁴ uses **Caustic Potash**, because it dissolves the horny layers of the skin, and lays bare the diseased tissues. While it destroys everything indiscriminately, it can, on the other hand, be accurately limited in its effects by one accustomed to its use. X rays should be used for larger areas, but caustic potash may be used as an adjunct. Arsenic, because of the great pain it causes, should only be used for small, well-defined lesions.

REFERENCES.—¹*Berl. klin. Woch.* Oct. 9, 1905; ²*Brit. Med. Jour.* Oct. 6 1906; ³*Brit. Jour. Derm.* Mar. 1906; ⁴*Jour. Cut. Dis.* N.Y. Aug. 1906.

ERYSIPELAS. (See SERUM-THERAPEUTICS.)

EYE (General Therapeutics).*A. Hugh Thompson, M.D.*

Silver Salts.—An important research has been undertaken by C. R. Marshall and Neave for the Therapeutic Committee of the British Medical Association on the bactericidal action of silver compounds¹. Their method was, after first determining the percentage of silver in each of the substances to be investigated, to prepare solutions from each, containing definite percentages of silver. The bactericidal actions of the various solutions was then determined both on a mixed culture and on a pure culture of *Staphylococcus pyogenes aureus*. The experiments showed that the various silver compounds fall into three groups: (1) Those which are powerfully bactericidal; this group includes most of the substances investigated, and among them both silver nitrate and protargol, though it is to be noted that, whereas silver nitrate contains 63·6 per cent of silver, protargol only contains 7·4 per cent, so that the equivalent of a 2 per cent solution of silver nitrate is a 20 per cent solution of protargol. (2) One compound—nargol—much less powerfully bactericidal. (3) Two—argyrol and collargol—which possess practically no bactericidal action. Since collargol contains 86·6 per cent and argyrol 20 per cent of silver, it is evident that the amount of silver which a compound may contain is no criterion of its bactericidal power. On the other hand, the bactericidal power of a drug is not necessarily a measure of its clinical usefulness: otherwise how can the excellent results obtained by many surgeons with argyrol in gonorrhœal ophthalmia be explained?² The question as to the ideal prophylactic against this disease continues to be discussed. Leopold³ still uses **Nitrate of Silver**, but instead of dropping a 2 per cent solution into the eyes of the newborn, uses a 1 per cent solution, which he finds equally effective and far less irritating. At Dresden, during the years 1902–1905, 6,589 infants were treated with the 1 per cent solution. Eighteen developed ophthalmia neonatorum, but of these 11 were cases of “late infection” developing on the sixth day or later, leaving only 7 cases, or about 0·1 per cent, in which the 1 per cent solution was ineffective, and even these cases may have been due to the instillations not having been properly performed. Herff⁴, at Basel, used 10 per cent **Protargol** for 3,009 infants, with only a single case of mild gonococcal ophthalmia, developing on the fifth day. He also used a new salt of silver known as **Sophol**, a formo-nuclein of silver containing 20 per cent of silver in solutions of 10, and (later) of 5 per cent, with equally good results. The advantage claimed for the new drug is that, like argyrol, it has absolutely no irritating effect on the eye, while it is said to be as powerful a bactericide as protargol.

Another of the newer salts of silver that have already been mentioned—**Collargol**—is specially recommended by Ramsay⁵ to be used, in recent wounds of the eyeball, in the form of gelatin wafers containing 10 per cent of the drug. “If the injured surface be aseptic, the collargol gelatin at once adheres to it, thereby sealing the wound and covering it up completely with an antiseptic plaster, under which healing goes

on with great rapidity." Collargol has also, says Ramsay, a wonderful power in clearing up inflammatory deposits in the cornea. For this purpose he recommends the instillation of a 5 per cent solution of dionine every morning, and the introduction of a 10 per cent gelatin dose of collargol every evening.

Dionine is undoubtedly the best analgesic we possess for cases of deep ocular pain, such as occurs in glaucoma or irido-cyclitis. It also, as Hinshelwood⁶ says, possesses a remarkable power of clearing corneal opacities when they are recent. In corneitis, while there is still inflammation, he uses **Atropine** combined with 1 or 2 per cent of dionine. For clearing corneal opacities he always uses dionine in the form of an ointment, 1, 2, or 3 per cent. Wray⁷ reports a case of iritis in which dionine produced a distinct miosis, which could not at first be overcome by atropine. There is, therefore, a danger in prescribing the drug for home use without first having satisfied oneself as to its safety.

Local Anæsthetics.—Yet another substitute for cocaine has made its appearance—this time from Germany. It is a derivative of glycerin, and its chemical name is, we are told, muriate of benzoyltetramethyldiaminoethyldimethylcarbinol, while commercially it is sold as **Alypin**. The number of these local anæsthetics is now becoming so embarrassing that it will be well to take stock of their relative merits.

Cocaine is well known and universally used. It has, however, certain disadvantages, viz. (1) Besides the anæsthetic properties for which it is employed, it has certain other properties which may be undesirable. It dilates the pupil, and its prolonged use has a deleterious effect on the corneal epithelium. (2) Its solutions cannot be boiled, and must, therefore, always be freshly prepared. (3) When injected subcutaneously, or swallowed (as may happen after injecting it into the nasal duct), it may have a toxic effect. (4) It is an expensive drug.

In some or all of these respects the newer rivals of cocaine claim a superiority⁸. **Holocaine**, in a 1 per cent solution, is equal or superior to cocaine in its anæsthetic effect on the cornea, without having any influence either on the pupil or on the corneal epithelium. With regard to toxicity, however, it is more dangerous than cocaine, and for this reason is unsuited for injection, either subcutaneously or subconjunctivally, or into the lacrimal passages.

Eucaïne Lactate, in a 2 or 3 per cent solution, has no action on the pupil or corneal epithelium, can be boiled with impunity, and is said to be less toxic than cocaine, and to be comparatively cheap (Stephenson).

Stovaine is used, more especially in France, in a 4 per cent solution, and was mentioned in last year's *Annual*. Further reports tend to confirm what was then stated. It has a slight dilating action on the pupil, can be boiled with impunity, and, according to Stephenson⁹, its toxic properties are only from one-half to a third those of cocaine. This estimate corresponds with the results of some experiments on dogs performed by Baylac¹⁰. Sinclair¹¹, on the other hand, reports unfavourably on its toxic properties, and regards it as by no means so safe

as cocaine. It has a vasodilator action which may be disadvantageous in operative work, and its association with adrenalin is especially contra-indicated, as the skin has been observed to become gangrenous where the two drugs have been injected together¹².

For **Alypin** in a 2 per cent solution, nearly exactly the same advantages are claimed as for stovaine¹³. It has no action on pupil or accommodation, it can be boiled, it is said to be relatively cheap, and its toxicity is said to be only slight. Like stovaine, it acts as a vasodilator when injected subcutaneously. Darier¹⁴, who has tried it, while not condemning it, can see no advantage in its use over that of the older drugs. Like all new drugs, its virtues are first brought to our notice, while any disadvantages it may have are recorded somewhat later. Already a case of serious toxic effects is reported (by Griffith¹⁵) resulting from the mere instillation of a 2 per cent solution into the conjunctival sac, preparatory to the removal of a foreign body from the cornea.

REFERENCES.—¹*Brit. Med. Jour.* Aug. 18, 1906; ²*Med. Ann.* 1906, p. 207; ³*Münch med. Woch.* May 1, 1906; ⁴*Ibid.* May 15, 1906; ⁵*Lancet*, July 7, 1906; ⁶*Brit. Med. Jour.* May 12, 1906; ⁷*Ibid.* July 21, 1906; ⁸*Med. Press*, Aug. 16, 1906; ⁹*Ibid.*; ¹⁰*Prov. Méd.* June 16, 1906, and *Brit. Med. Jour.* Sept. 15, 1906; ¹¹*Jour. Cutan. Dis.* July, 1905, and *Ophthalm.* Jan. 1906, p. 42; ¹²*Ophth. Rev.* Nov. 1905, p. 330; ¹³*Ibid.* Jan. 1906; ¹⁴*Ophthalm.* June, 1906; ¹⁵*Ibid.* Jan. 1906, p. 55.

EYE (Injuries to the).

A. Hugh Thompson, M.D.

Compensation for Injuries to the Eye.—The advice of the ophthalmic surgeon is frequently required as to the extent to which injuries to the eyes incapacitate a man for work, and there is great need for more general rules than are as yet recognized, to help him in giving his opinion. Sym¹ suggests that trades should be classified according to the amount of sight required for the proper performance of the work. "For certain trades," he says, "full vision is a necessity, but not necessarily binocular full vision, and perhaps not necessarily binocular vision at all; for certain others, binocular vision is an absolute necessity, but not necessarily full vision with either eye; for yet others, vision is not necessarily either full or binocular. As examples of the three classes I might take the trades of watchmaker for the first, of joiner for the second, and of miner for the third." In assessing the compensation for, say, the total loss of one eye, the amount should be divided into two parts: first, a definite proportion of the man's wages, irrespective of the actual immediate difference that the loss makes to his earning capacity, and second, an amount depending solely on the loss of earning capacity involved. In many cases, if the remaining eye was a good one, the second factor might be nil. In other cases, the same accident, namely loss of one eye, occurring to two men employed in the same trade, might involve very different amounts of compensation, according as the sight of the second eye was above or below the minimum required for the efficient performance of work in that particular trade. Sym proposes that each skilled

workman should have a health ticket, showing, besides other matters, the actual state of his vision. Any employer who accepted a worker without it, would expose himself to extra risks.

REFERENCES.—¹*Ophth. Rev.* Oct. 1906.

FÆCES (Examination of).

Robt. Hutchison, M.D.

As the diagnostic and therapeutic indications which a careful examination of the fæces furnishes are daily receiving wider recognition, no apology need be offered for amplifying the article which appeared on this subject in last year's *Annual* by the following abstract of a recent paper by Dr. Robert Baumstark.¹

To try to form an opinion of the capabilities of the intestine by means of examination of the fæces with *daily changing* food is impossible, for even in healthy individuals there are manifold nutritious elements which are not made use of, and which are ejected in varying quantities in the fæces. A special diet must be adhered to, and must fulfil the following conditions: (1) It must contain the necessary amount of calories and suitable proportions of the three chief groups of food-stuffs; (2) It must be digestible, taken readily, and agree well, in order that it can be assimilated even by a disordered intestine; (3) Coarse macroscopical remnants must not appear in the fæces. At the same time the consistency of the fæces must not be so fine as to lack the power of stimulating the bowel; (4) It must be easily obtained in any household. These conditions have at last been fulfilled, after many years of experiment, in a diet devised by Adolph Schmidt. This diet is as follows: Morning: $\frac{1}{2}$ litre ($\frac{3}{4}$ pint) milk or $\frac{1}{2}$ litre cocoa (made with cocoa powder 20 grams, sugar 10 grams, milk 0.1 litre, rest 0.4 litre water) and 50 grams rusk. Before noon: $\frac{1}{2}$ litre gruel (made with 40 grams groats, 10 grams butter, 200 grams milk, one egg, and 300 grams water). Noon: 125 grams minced beef lightly fried (so as to be raw inside) in 20 grams butter, 190 grams potatoes mashed with 100 grams milk, and 10 grams butter. Afternoon: The same as in the morning. Evening: The same as in the forenoon. Altogether the diet consists of $1\frac{1}{2}$ litres milk, 100 grams rusk, two eggs, 50 grams butter, 125 grams minced beef, 190 grams potatoes, and 80 grams oatmeal. This total represents 2234 calories.

It is wise to examine the stools carefully before the test diet. If these contain irritating matter and mucus, the latter under the influence of the test diet generally disappears quickly. The examination of the fæces for remnants of undigested food is only to be started after the second or third motion, when one can be certain that they possess the properties of the test diet—namely, an even consistency and a somewhat lighter colour. The more serious cases are best kept in bed. To patients who are treated at home one can supply test-glasses (15 cms. in height, 8 cms. in diameter), and so lessen the difficulty of sending the fæces.

The systematic examination of the fresh fæces is: (1) Macroscopic; (2) Microscopic; and (3) Chemical.

The Macroscopic Examination.—This, the most important of all, establishes the consistency, colour, and smell of the fæces. The motion is thoroughly stirred with a wooden spatula, and a quantity of the size of a walnut is put in a grater and ground down with a glass pestle with a gradual addition of distilled water to an absolutely fluid mass. When no more solid parts exist, pour it on a large black plate. With normal intestinal action nothing but macroscopically recognizable remnants of cellular particles (rusk, gruel, cocoa) of the test diet should be found in the fæces. The following are of importance as pathological food remnants:—

1. The remnants of connective tissue and tendons from the minced meat which has been consumed, and these, owing to their light yellow colour, their fibrous form, and their firm consistency, can be recognized and most easily distinguished from mucus. Where any doubt exists, a small filament can be treated with a drop of acetic acid; in the case of connective tissue the filamentous structure vanishes; in the case of mucus it only then becomes visible. Quite isolated small sinewy filaments are to be found sometimes with quite normal digestions, but when in great quantity they are always pathological.

2. Remnants of muscle which look like very small brown-coloured splinters of wood. They are soft, become smaller when pressed, and disclose under the microscope muscle structure. In many cases connective tissue and remnants of muscle are to be met with in the same stool.

3. Remnants of potato, sago, and similar transparent grain, which are frequently mistaken for mucus, but which can be distinguished by their globular form and their hard consistency; they stand out above the level of the thin, spread-out layer of the fæces. Under the microscope the potato cells appear to be either empty or filled with bluish (stained with iodine) coloured grains of starch.

The Microscopic Examination.—This is chiefly useful for the verification of the results obtained by the macroscopic examination; for example, in the differential diagnosis of connective tissue and mucus shreds. Three microscopic preparations are made, distilled water being added when the ground-up fæces are too hard. The first is simply a small particle placed on a slide and pressed by a cover-glass into a thin layer. The second is rubbed up with a little drop of 30 per cent acetic acid solution and held over a flame until it begins to boil; the third is rubbed up with a little drop of a strong solution of iodine in iodide of potassium (iodine 1 iodide of potassium 2, distilled water 50), and covered.

Under normal intestinal conditions the following should be observed in the preparations: (1) Preparation without addition: muscular fibres (flake-like formations coloured yellow and rounded at the edges, with indications here and there of transverse striæ), some scattered small and larger yellow lime salts, light and dark yellow flakes consisting of sebates of lime, uncoloured (unstained) soaps, single potato cells empty, sparse remnants of chaff from gruel, and remnants of cocoa

where cocoa was given instead of milk ; (2) In the second preparation, when it is placed under the microscope whilst still hot, the larger lime salts and soap flakes are melted to neutral fat drops, which after they are cold become solidified into small sebatic acid flakes ; (3) In the third preparation, which is brown-coloured from the iodine, the potato cells now violet (but not blue), and sometimes violet-coloured sporules (*Clostridium butyricum*) are met with.

Pathologically the following may be observed in the three preparations :—

(1) Broken pieces of muscle tissue in larger number with more clearly defined transverse striæ and sharp edges, neutral fat drops, sebatic acid, and soap needles in such quantity that they form the largest part of the preparation, and an abundant quantity of potato cells with more or less well-preserved grains of starch :

(2) In cold acetic acid preparations there are pathologically such a number of sebatic acid flocculi that all of the other component parts are in the minority.

(3) In the iodine preparation are bluish coloured potato cells, as also scattered remnants of grains of starch, blue or violet sporules or bacterial flora, and oat cells which are yellow coloured from the iodine.

The Chemical Examination.—This examination, now taken in hand, begins with a determination of the reaction. Normally, the reaction of the fæces is very feebly acid or feebly alkaline and often amphoteric. The test is made by placing a strip of blue and red litmus paper on (not in) a portion of the fæces which has been mixed with distilled water. A marked deviation in one or the other direction is pathological. It would be best after this reaction test to apply the incubator test immediately in order to arrive at the amount of fermentation—that is to say, the amount of decomposable substance which is contained in the fæces. In the lower part of a Strasburg fermentation tube are placed five grams (of the size of a walnut, less in the case of hard stools) of the stirred-up but undiluted stools. It is then filled with water and closed with the indiarubber stopper in order to avoid air-bubbles. The tube standing above the bottom vessel is now removed and filled with tap-water ; then, after turning the bottom vessel downwards it is closed with the indiarubber stopper. The second tube, which has an aperture above, remains empty and serves to take up the water forced out by the rising gases. After this the tube is placed in the incubator for 24 hours at 37° C. For carrying out the sublimate test a small portion of the stools which have been mixed up with distilled water must be mixed with concentrated aqueous solution of sublimate and left standing for 24 hours in a small glass vessel. The normal colouring matter, hydrobilirubin, colours it red, and the fresher the stools the deeper will be the colour. The green colouring of a part of the fæces is pathological ; even when only under the microscope green-coloured particles are visible, it proves that there is unchanged biliary colouring matter in the fæces. All these examinations described above would be best arranged in succession in the manner stated,

which with some practice would not occupy more than from 10 to 12 minutes.

The diagnostic conclusions to be drawn from the foregoing observations are as follows. The presence of connective tissue remnants in the test-diet stools points with certainty to a disorder of the digestion, as only the gastric juice is able to dissolve raw connective tissue—i.e., from the centre and not from the well-cooked part of the meat. Achylia or hypochylia would usually be accountable for such a condition. Excessive peristalsis perhaps also plays an important part in some of these cases. Again, in excessive acidity associated with insufficient pepsine secretion (cases which not infrequently occur) the raw tissue meets with unfavourable conditions and appears again in the stools. A very minute examination of the stomach should be carried out in these circumstances. If muscle remnants are found macroscopically, or even in considerable amount microscopically, disturbance of the digestion in the small intestine may be inferred, for the stomach plays only an unimportant part in the dissolving of meat fibre, and the digestion of meat does not take place in the colon. With both connective tissue and muscle remnants in the stools it may be concluded that both stomach and small intestine are deranged.

With regard to the digestion of fat, it is to be observed that slighter variations in the fatty contents of the normal stool have no diagnostic meaning, for every stool contains fat in the normal fæces to the extent of 23 per cent of the dry substance. A morbid increase of the fatty contents is proved at the macroscopic examination by the clayey quality of the light-coloured, nearly white fæces, by the very sour reaction, by the copious quantity of the fæces, and by their filmy appearance when rubbed up. Microscopical increase of the sebaceous acid flocculi in the cold acetic acid preparation, and neutral fat drops and salts of lime and soap crystals in a native preparation, confirm the diagnosis. If the sublimate test shows a complete absence of bile in the stools, together with an increase of the fatty contents (in which case icterus also occurs), the cause of the disease is to be sought for in the biliary duct system. If, however, in conjunction with the increase of the fat contents (especially in the form of neutral fat drops in the native preparation) there are signs of muscle tissue, simultaneously with the presence of hydrobilirubin and absence of mucus, then the pancreas is the seat of the disease.

In rare cases, where biliary deficiencies and pancreatic diseases are excluded, severe forms of intestinal disease, such as tuberculosis, amyloid disease, or tabes mesenterica may be the cause of the derangement of fat absorption. The digestion of albumin is then likewise disturbed, and as a rule prior to the impairment of fat absorption. Moreover, purely functional disturbances of absorption limited to fats are sometimes observed. The simultaneous appearance, however, of mucus and processes of decomposition are decisive as regards an organic disease of the intestinal wall itself.

A complete absence of red or green colouring in the sublimate test

shows absence of bile in the intestine (and icterus exists). If icterus is non-existent, then it is a question of a temporary suspension of the secretion of bile. In the case of brown, fresh stools, absence of red colouring or a muddy colour would point to intestinal decomposition. When green colouring (bilirubin) is macroscopically demonstrated, or if green colouring of separate particles—for example, of muscle tissue—is seen microscopically, it shows too rapid a passage through the colon; if the entire stool is coloured green, then most probably the small intestine is also involved. If there is a simultaneous appearance of small mucous flocculi described above, the cause is an inflammation of the mucous membrane of the small intestine.

In order to prove if there is any disturbance in the digestion of carbohydrates, it is best to examine the starch particles of the food given in the test diet, chiefly the potato grains. In the potato meal, normally there only appear in the fæces some empty violet-coloured potato cells. If under the microscopic and macroscopic examinations a great number of potato cells are to be seen with bluish-coloured starch grains scattered about or lying in their cells, then this shows a diminished digestive power for carbohydrates. This latter condition is frequently confirmed by a light-brown, frothy appearance and an acid reaction of the stools, by a stronger fermentation reaction (fermentation tube), and under the microscope the appearance of granulose sporules or minute fungi. This deficiency in the utilization of the carbohydrates is regarded as functional disorder of a milder kind, and is designated by Schmidt under the name of "fermentative dyspepsia." A negative result of the fermentation test does not exclude fermentative dyspepsia when the above-mentioned microscopic and macroscopic signs of defective digestion of the carbohydrates are present, as the fermentation may have terminated with the formation of acid products without any gas.

The Incubator Test.—After keeping the small fermentation tube in the incubator at 37° C. very little gas will be formed under normal conditions. If one-third or more of the tube fills with water, that is pathological. It certainly betokens a morbid increase of carbohydrate fermentation if the reaction of the stools now tested once again is found to be strongly acid instead of being only feebly acid as before. It indicates degradation of the albumin when reaction becomes more alkaline. When fermentation exists, the fæces usually assume a lighter colour and smell of butyric acid; with decomposition, on the contrary, they become darker and have a very unpleasant smell. In the case of fermentation, moreover, the formation of gases takes place more quickly and more freely, while with decomposition more slowly and more scantily. The signification of fermentation has already been explained. Excessive decomposition of albumin occurs usually only in cases of severe diseases of the digestive tract—e.g., inflammatory changes of the mucous membrane of the colon, because it is especially the pathological products of the intestinal wall—mucus, serum, pus—which occasion putrefaction, while merely functional disorders of the digestion of albumin seldom give rise to decomposition.

REFERENCE.—¹*Lancet*, June 16, 1906.

FEMUR (Separation of Lower Epiphysis of).*Priestley Leech, M.D., F.R.C.S.*

Hartwell¹ reports the case of a boy, seven years old, who had separation of the lower femoral epiphysis. Two months later an operation was performed and the deformity remedied. Eighteen months later the boy was examined, and it was found that both his lower extremities had grown one and three-quarter inches, thus showing there was no impairment of growth.

REFERENCE.—¹*Ann. Surg.* April, 1906, p. 614.

FISSURE IN ANO. (See ANUS).**FLAT-FOOT.***Priestley Leech, M.D., F.R.C.S.*

Haglund¹ describes two cases of flat-foot in young girls which he believes are due to fractures of the tubercle of the scaphoid before ossification has taken place. There are the ordinary signs of flat-foot, but, in addition, the tubercle of the scaphoid could be seen and felt with abnormal clearness. To the touch, it gave the impression of a synovial ganglion, and was very painful. Radiograph examination showed that it was bony. Walking and standing upright were very painful. In the second case the patient stated that the pain and deformity had appeared immediately after a dancing exercise.

REFERENCE.—¹*Upsala läkareförenings förhandlingar* xi. 3-4, quoted in *Sem. Méd.* Aug. 20, 1906.

FOREIGN BODIES IN ŒSOPHAGUS. *Priestley Leech, M.D., F.R.C.S.*

Hugh Rigby¹ reports a case of impaction of a leaden toy bicycle in the Œsophagus of a girl four years old. It was well shown by a radiograph, and on passing a bougie an obstruction was met with seven inches from the teeth. Attempts at removal by the mouth failed, and external Œsophagotomy ultimately succeeded.

Arthur D. Black² gives notes on 49 cases of swallowing artificial dentures. There were 10 fatalities out of the 49 cases: 4 caused ulceration through the wall of Œsophagus into aorta, pericardium, or lung; 1 gave rise to bronchitis; 1 to closure of the glottis; 1 lodged in the trachea, causing death by asphyxia; 1 was found low in the Œsophagus post mortem, death having occurred in three months; 1 patient died of inflammation after having vomited the plate; and 1 died a week after swallowing the plate, but it could not be found post mortem. In the 39 cases which recovered, 12 plates passed through the entire digestive tract, 15 were fished out through the mouth, 6 were vomited or coughed up, and 6 were removed by operations through the neck.

REFERENCES.—¹*Ann. Surg.* Mar. 1906; ²*North West. Dent. Jour.* quoted in *Canad. Jour. Med. and Surg.*

"FOURTH DISEASE."*E. W. Goodall, M.D.*

Unruh¹ believes in the distinctness of this disease, the chief characteristic of which he describes as follows:—

Rash.—*Elements*: Small, slightly raised puncta, discrete or

confluent, smaller than the spots of measles or rubella ; with or without general erythema ; colour, bright red. *Distribution* : Trunk and limbs, and in patches on face ; the lips, nose, and chin are free from rash ; the extensor surfaces of the arms and the regions of joints are markedly affected. *Duration* : 26 to 36 hours, or a little longer ; it never becomes of a brownish tint. *Desquamation* begins at once and consists of small scales. Mucous membranes are sometimes affected with a slight catarrh. *Temperature* raised a few degrees at onset of illness, normal by beginning of third day. *Pulse-rate* in proportion to temperature. *Glands* usually not enlarged. No complications. *Age of patients*, $2\frac{1}{2}$ to 17 years. *Incubation period*, 15 days.

REFERENCE.—*¹Deut. Arch. f. klin. Med.* Bd. 85, Oct. 1905, quoted in *Med. Chron.* May, 1906.

FRACTURES.

Priestley Leech, M.D., F.R.C.S.

Head of Radius.—T. T. Thomas¹ saw two cases of this injury which presented all the features of a severe injury to the elbow joint, but gave no sign of fracture beyond the presence of great pain over the radial head. In each case a skiagraph showed a vertical fracture of the head of the radius. He collected 48 instances of this fracture, and of these no less than 40 were only discovered on the post-mortem table. Contrasted with these, discovered after a most extensive research in literature, he found no less than 55 instances of this fracture among recent skiagraphs taken in Philadelphia. Experimental investigations showed that, with arms detached at the shoulder joint placed palm downwards on the ground, with the forearm pronated and the elbow fully extended, blows with a wooden mallet on the head of the humerus produced a fracture of the postero-external segment of the radial head ; and this is the typical fracture found in recorded cases and in skiagraphs. The amount of separation of the smaller fragment is slight, as it usually remains attached by a strip of periosteum or by the unbroken orbicular ligament. For these reasons crepitus and deformity are absent. It is rare for the fragment to become detached, and therefore open operation is not called for.

Humerus.—G. M. Dorrance² had under his care a boy fourteen years of age, with the history that while practising jiu-jitsu with a playmate, he had fractured his humerus. The hold obtained by his opponent consisted in catching him by the left wrist with the forearm flexed on the arm, and rotating the forearm outwards. When seen, the deformity consisted of an outward and upward displacement of the upper end of the lower fragment, with $1\frac{3}{4}$ in. of shortening.

Fessler³ emphasizes the fact that *paralysis* following fractures of the humerus is due to over-extension of the nerve across the angle of fracture. There are three forms of paralysis accompanying fracture of the humerus: (1) Those due to the trauma which caused the fracture, or to injury from sharp fragments of bone ; (2) To stretching of the nerve and consequent loss of function ; (3) To

secondary causes, pressure from callus or fibrous tissue, processes of necrosis, etc. The second form is the most frequent, but is apt to be mistaken for the third, as it begins a few days after the fracture, while the limb is bandaged, and generally passes unnoticed until the dressing is removed. Sensation and motion should therefore be carefully tested every few days, and it should be particularly mentioned that, in fractures of the upper part of the humerus, sensation is particularly affected, and in those of the lower part, motion. There may be motor paralysis with no sensory disturbance.

The nerve is ordinarily stretched over the upper end of the lower fragment, and if any sign of paralysis is noted, a dressing should be applied which will bring this into place. A weight extension apparatus over a pulley may be applied to the elbow flexed at right angles to the arm, and if necessary another pulley and weight may be attached to a cord which runs through a pulley on the opposite side of the bed across the body, and is attached to loops around the arm above or below the place of fracture. Avoid pressure at the point of fracture at all costs.



Fig. 21.

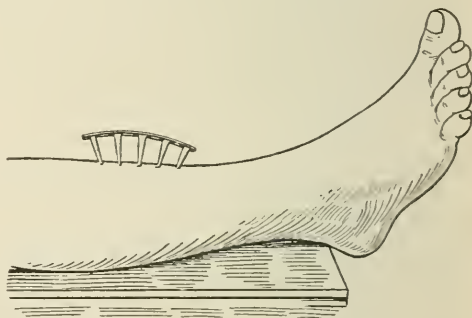


Fig. 22.

Later, a fenestrated plaster of Paris case may be applied. If the paralysis lasts three to six weeks after the fracture, cut down on the nerve, and examine it to determine the cause. Resect a piece of nerve if necessary, and if union of the bone is not good, a piece of the humerus may be resected also, to enable the ends of the nerve to meet.

The Treatment of Complicated Fractures.—Prof. Jaboulay¹ reports a case of compound fracture of the tibia and fibula where a good result was obtained by using a cramp which he had made in 1893, and which he used for coupling the femoro-tibial ends in excision of the knee. The apparatus can be removed without interfering with the wound. Figs. 21 and 22 show its use very well. It can be used for ununited fractures after the pseudo-arthritis has been removed.

Operative Treatment of Simple Fractures.—Mr. Arbuthnot Lane is well known as a strong advocate of operative interference in simple fractures. The strict details which are necessary for rendering the skin aseptic have been given before, but in a recent illustrated article⁵ he shows how screws, silver wire, and staples may be used in the

treatment of fractured bones. If silver wire be employed it should be pure, and before use it should be raised to a red heat in a flame to increase its flexibility. Generally speaking, the screw is by far the

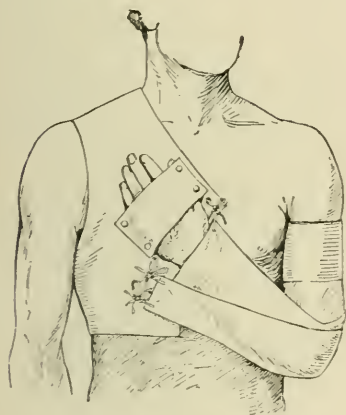


Fig. 23.

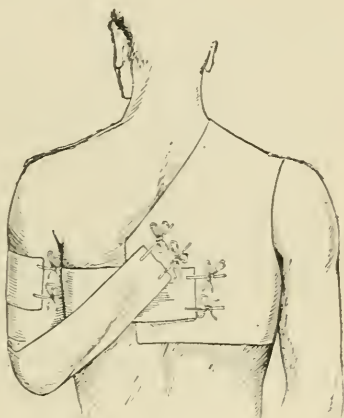


Fig. 24.

Manning's apparatus for fractured clavicle.

most efficient, but remember in drilling that the calibre of the barrel of the screw is larger than the thread, and that an aperture in dense bone which readily admits the thread may be too small for the

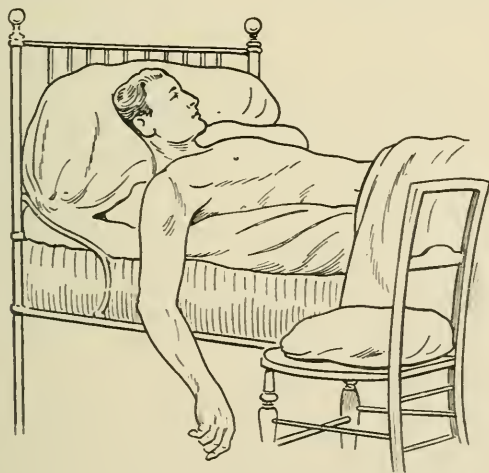


Fig. 25.—Couteaud's method in treatment of fractured clavicle.

barrel ; if the screw is then forcibly driven into the dense bone, the bone may be hopelessly comminuted. The form of staple he now uses resembles that devised by Dr. A. Jacoel, and which has since been

slightly modified by Dr. Dujarier. [These staples are very useful in certain cases where neither screws nor wire can be used.—ED.]

Clavicle.—Manning⁶ describes an apparatus for the treatment of fractured clavicle after Sayres' method without the use of strapping. The apparatus consists of three parts: a shoulder piece which is practically half a short waistcoat, an elbow piece, and the webbing to draw back the upper arm; all are interchangeable from side to side; the first two are made of jean, and the webbing is similar to that used for babies' binders. The accompanying sketches (*Figs. 23, 24*) show how the apparatus is applied, a pad being placed in the axilla.

Couteaud⁷ recommends an old method of treating this fracture by confinement to bed. He says the deformity is much less by this method, and that by any application of splints, etc., it is impossible to keep the fragments immobile. He places a pillow between the shoulders to fix the shoulder, and leaves the arm hanging outside the bed as in the illustration, *Fig. 25*, with a chair furnished with a cushion to support the forearm during the night, or when the hanging position is found too irksome. A slight drawback is the œdema of the arm, which soon yields to massage. He gives notes of five cases thus treated.

REFERENCES.—¹*Univ. Pennsylv. Med. Bull.* 1905, p. 184, quoted in *Med. Chron.* Mar. 1906; ²*Ann. Surg.* Nov. 1905; ³*Deut. Zeits. f. Chir.* Bd. lxxviii. Hft. 1, quoted in *Ther. Gaz.* Oct. 15, 1905; ⁴*Sem. Méd.* June 13, 1906, p. 277; ⁵*Brit. Med. Jour.* Nov. 18, 1905, p. 1325; ⁶*Pract.* Sept. 1906; ⁷*Gaz. d. Hôp.* Sept. 4, 1906.

FRONTAL SINUS (Suppuration of). (*See* SINUSES, DISEASES OF.)

FURUNCLE.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

When there is no pus formation, Maras¹ palpates the openings of the follicles in the infected area to discover those that are painful. Into the painful ones he introduces the negative needle with a current of 1 to 2 ma. gradually increased to 10 ma., the liberated hydrogen acting as a flush to the follicle. Then the current is reversed in order to secure the disinfecting action of the oxygen, and finally returned to the original direction to again wash out the follicle with hydrogen.

When pus is present, this procedure has to be done twice daily. Time and patience are evidently much required in this treatment.

REFERENCE.—¹*Münch. med. Woch.* May 23, 1905.

FURUNCLE (Treatment by Passive Congestion). (*See* INFLAMMATION.)

GALL-BLADDER (Diseases of).

A. W. Mayo Robson, F.R.C.S.

Gall-bladder-duodenal Fistula.—It is usually considered that when gall-stones have ulcerated their way into the duodenum, if they are fortunate enough to pass through the intestinal canal without causing obstruction, the patients will be speedily relieved of their troubles. It has, however, fallen to my lot to operate on a number of cases in which fistulæ between the gall-bladder and duodenum have proved

sources of disease many years after the original trouble. During the past year I have operated on two cases of gall-bladder-duodenal fistula in which attacks of spasmodic pain resembling those of cholelithiasis, associated with ague-like attacks like those of infective cholangitis, were due to the infection of the gall-bladder and retention of the infected products. Both cases were due to the passage into the bowel, by a process of ulceration some years previously, of large concretions. They were cured by removal of the gall-bladder and closure of the duodenal fistula. The history in both cases was clearly given, and in neither was there a difficulty in making a probable diagnosis.

Indications and Contra-indications for Removal of the Gall-bladder.—I think it is necessary to offer a protest against the indiscriminate removal of the gall-bladder in all cases in which an operation on the biliary passages is called for, a procedure which has been advocated by a number of surgeons at home and abroad.

It is a question whether the loss of the gall-bladder does not lead to a dilatation of the common duct so as to replace to a certain extent the reservoir function of the gall-bladder. That this has occurred in some cases I know from personal experience. If this is universal, it seems not unlikely that after cholecystectomy, the dilated common and hepatic ducts may ultimately form a reservoir for the development of concretions. Moreover, if the bile-ducts within and outside the liver have to act as reservoirs, there must necessarily be back pressure on the secreting part of the liver, and possibly biliary absorption, conditions which do not apply when the gall-bladder is acting as a bile-storer.

Sufficient time has not elapsed to show whether the liver is injuriously affected by this pressure and absorption, as it is only recently that cholecystectomy for almost normal gall-bladders has been adopted by some enthusiasts as a routine procedure.

Whether cirrhosis of the liver and the pancreas will result in a certain proportion of cases remains to be seen.

The reason for saving the gall-bladder, where it can be done safely, is the possibility that when once the bile-ducts have been infected, an interstitial pancreatitis may ensue and, by compressing the bile-ducts, may lead to chronic jaundice, which can be much more efficiently treated either by cholecystotomy or by cholecystenterostomy if the gall-bladder is present; whereas drainage of the bile passages for a sufficient length of time in order to give relief to this condition can only be imperfectly performed if the gall-bladder has been removed.

In ordinary cases of cholelithiasis, cholecystotomy with drainage of the gall-bladder is a very safe and efficient operation, and if the ducts are cleared there need be no fear of fistula or of recurrence of gall-stones. Seeing that cholecystotomy has led to such good results, both immediate and remote, in the surgery of gall-stones, the operation should not be too hastily condemned and replaced by cholecystectomy as a routine procedure. My own experience is that

cholecystectomy, though a more prolonged operation than simple drainage of the gall-bladder, can, with due care and in experienced hands, be performed with hardly more immediate risk, and that when the gall-bladder is contracted and infected, or inflamed and thickened, or gangrenous, or much dilated, it is better to remove it.

Since introducing the method of more completely exposing the biliary tracts when operating for gall-stones, I find no difficulty in deciding as to the bile-ducts being quite free from concretions—a necessary condition before cholecystectomy is justifiable.



Fig. 26.



Fig. 27.

Fig. 26.—A gall-bladder of which the walls are much thickened from acute infective inflammation, the swelling reaching a maximum of three-quarters of an inch. The mucosa is of a deep brownish-black colour; the peritoneum is intensely and uniformly congested. The gall-bladder contained three large calculi. The deep colour of the mucosa is chiefly due to interstitial hæmorrhage, the lining epithelium has not been shed. The parts were removed from a middle-aged lady on February 20, 1905. On the 17th she had been seized with severe pain in the right side of the abdomen, but until then had had no trouble. When seen, her temperature was 104° F., pulse 120; there were signs of peritonitis in the region of the gall-bladder. Operation was carried out on the following morning. A sero-purulent exudation was found in the general peritoneal cavity, and the exterior of the gall-bladder was of a plum colour. After separation of adhesions, the cystic duct was grasped in forceps close to the common duct, the bladder and cystic duct being then removed. The patient made a good recovery.

Fig. 27.—A gall-bladder of which the walls are greatly thickened, and the lining congested from chronic inflammation. A calculus of considerable size lies in the fundus, and numerous other calculi are in the gall-bladder itself. Good recovery.

Seeing that recurrence of gall-stones after cholecystotomy with efficient drainage is an extremely rare event; that the danger of cholecystotomy in uncomplicated cholelithiasis is almost nil, not more than 1 per cent over a large number of cases; that drainage of the bile passages after any gall-stone operation is distinctly advantageous; and that if at some future time it should be necessary to drain the bile passages—say, for obstructive jaundice or interstitial pancreatitis—the difficulties would be increased by the absence of a gall-bladder,

though not by a cholecystotomy; my feeling is very decided that cholecystectomy should not replace the simple operation of cholecystotomy as a routine procedure in operating for gall-stones.

Cholecystectomy is indicated in the following conditions:—

1. In cancer or other new growth where the disease is local and limited.

2. In contracted and useless gall-bladder, the result of repeated attacks of cholecystitis.

3. In dilated or hypertrophied gall-bladder resulting from obstruction in the cystic duct.

- a. Always, if resulting from stricture. (b) Usually, if resulting from impacted gall-stones which may have induced ulceration that will subsequently lead to stricture. (c) Usually, if resulting from kinking of the cystic duct or from adhesions.

4. In phlegmonous or gangrenous cholecystitis.

5. In empyema of the gall-bladder.

6. In calcareous degeneration of the gall-bladder.

7. In mucous fistula of the gall-bladder, the result of stricture or other obstruction of the cystic duct.

8. In gunshot or other serious injuries of the gall-bladder or cystic duct.

It is unnecessary in ordinary cholelithiasis, where the gall-bladder is not seriously damaged, and where the cystic duct is not ulcerated or narrowed by stricture; and it is contra-indicated in all cases where the surgeon cannot be certain that the deeper bile passages are free from obstruction, unless at the same time the cystic or common ducts be short-circuited into the intestine.

A series of 57 cases in which I have performed the operation of cholecystectomy show how varied are the conditions which may demand removal of the gall-bladder. They may be conveniently divided into simple and malignant. For simple conditions there were 46 operations, and for malignant 11.

Thirty-three were for gall-stones complicated by various morbid states, such as phlegmonous cholecystitis, gangrene of the gall-bladder, perforation of gall-bladder or bile ducts, calcification of gall-bladder, tumour of cystic duct, contraction of gall-bladder, and hour-glass contraction. Of the 33, 32 recovered; the one that died had perforation of the common duct and abscess in the right kidney pouch preceding the operation.

The practical conclusions which I feel confidence in urging, both from my own experience and that of others, are, that there is an undoubted relationship between cholelithiasis and cancer of the gall-bladder and ducts; and as gall-stones produce characteristic symptoms, and are therefore as a rule easily diagnosed, and since they can be removed in the early stages before serious complications have supervened with very little risk (in my experience, extending over some hundreds of operations, less than 1 per cent), the preventive treatment for cancer of the gall-bladder is obviously removal of the source of

irritation. So impressed am I with the importance of this view, that although I know the symptoms of gall-stones, which frequently depend on the associated catarrh, can often be relieved for a time by general treatment (though the gall-stones producing the catarrh cannot be removed by medicine), yet I consider it wise to recommend their early removal, not only because it can be safely done, but also because the symptoms are likely to recur and lead to other complications, and not least important, because, in a considerable percentage of such cases, malignant disease will be likely to supervene if the irritation be not removed.

A review of 1,500 operations on the gall-bladder and bile passages performed by W. J. and Charles H. Mayo¹ gave 66 deaths, 4.43 per cent. In the first 1,000 cases, the death-rate was 5 per cent; in the last 500, 3.2 per cent. This includes acute perforations with septic peritonitis and malignant disease.

There were 845 cholecystotomies, with a mortality of 2.13 per cent. In the last series of 500 there were 272 cholecystotomies, with a mortality of 1.47 per cent. Two of these were sudden deaths from pulmonary embolism.

Looked at from the standpoint of mortality, cholecystostomy is the safest for the average case, and must be considered the normal operation. As the authors had but one case of their own in the entire series of 1,500 operations in which gall-stones re-formed in the gall-bladder, this cannot be taken as a valid objection to leaving it *in situ*.

There are some conditions in which, after cholecystostomy, future trouble may be expected. First, in all those cases in which the cystic duct is obstructed by a stone, and the gall-bladder takes no part in the biliary circulation (contains no bile), other things being equal, it should be removed, as in this condition they have occasionally had to remove it secondarily for the relief of mucous fistula or colics due to obstruction, to drainage from kinking, or stricture. Second, thick-walled gall-bladders, which have become functionless, lead to a suspicion of malignant disease, and should be excised. They have in this way several times unexpectedly removed what proved to be an early carcinoma of the gall-bladder. One such patient is alive, more than three years after operation.

In connection with common-duct surgery it is not wise to remove a functioning gall-bladder unless for direct indication. This is particularly true if cholangitis exists, as common-duct cases more often require a secondary operation than any other, and the gall-bladder not only affords easy drainage and enables cholecystenterostomy should there be future contraction and obstruction of the common duct, but it is also a safe guide to the deep ducts if future trouble should arise.

The average patient was up in twelve days, and left the hospital within two weeks.

There was a total of 319 cholecystectomies, with a mortality of 3.13

per cent. In the cholecystectomies in the last series of 500 cases the mortality was 1.62 per cent. Cholecystectomy has an increasing field of usefulness, but its increased mortality, which, although slight, is for one reason or another fairly certain, prevents it from replacing cholecystostomy. At the same time, where the circumstances permit of easy removal of the gall-bladder, and the disease is confined entirely to this organ, it is the operation they most commonly perform, even in cases in which cholecystostomy would answer the purpose. But if the patient is very obese, and the gall-bladder has a broad attachment to the liver necessitating prolongation of the incision or increased manipulation, cholecystectomy is the more difficult and dangerous operation.

The authors give a report of 207 cases of *operation upon the common duct*. Such operations, so far as the mortality is concerned, can be divided into four groups. This arrangement is more or less artificial, as some cases are hard to classify.

In group 1 were 105 cases, with 3 deaths, 2.9 per cent, consisting of those patients in whom gall-stones were present in the common duct, but without immediately active symptoms.

In group 2 were 61 cases, with 10 deaths, 16 per cent. It was a series of cases in which there was active infection, not only in the common duct, but also involving the ducts of the liver. It was this group that was so often found associated with inflammatory diseases of the pancreas.

Group 3, complete obstruction of the common duct, had 29 cases and 10 deaths; 34 per cent.

Group 4 concerned malignant disease; 12 cases; 4 deaths, 33½ per cent mortality. Cancer of or involving the common duct occurs in two forms. (a) The primary tumour of the common duct or papillæ, a small, hard, greyish-white mass, with a tendency to remain localized until a late stage. They have seen several examples, and have had two primarily successful excisions, but no case which has lived beyond three years. (b) Common-duct obstructions from carcinoma extending downward from the gall-bladder and cystic duct, or from cancer of the head of the pancreas. These cases are of course inoperable, and even an exploration proved fatal in several instances.

One of the most interesting problems in connection with surgery of the bile tract concerns coincident inflammations of the pancreas. In a total of 86 out of the 1,500 cases, the pancreas was involved to such an extent as to be noticeable on examination. Four of these cases were acute, of which 2 recovered. Six were subacute, 2 of these having hæmorrhagic cysts; 5 recovered, and 1 died; 9 cancer, 5 deaths; 67 had chronic pancreatitis; the evidences usually consisted of hard nodules, most marked in the head of the pancreas and near to the common duct. Four cases, supposed to be common-duct obstruction from chronic pancreatitis alone, were shown by subsequent operation to have had an undiscovered stone in the ampulla. In a

few cases the pancreatic disease apparently was not secondary to the bile tract.

That the acute forms have had a deleterious effect upon the patient is unquestioned, but I have been unable to separate the harm done by the chronic inflammations from the essential condition in the bile tract, and I do not believe that unless it was obstructive it had a decided influence on the prognosis. It was the mortality and complications of delay that placed the early operation for appendicitis on a sound surgical footing. To remove the disease while still in the appendix, and before its rupture involved the abdominal cavity, was the logical conclusion. The same reasons apply, and with equal force, to the early operation for gall-stone disease. Remove the disease while still in the gall-bladder, with a mortality of from 1·47 per cent (cholecystostomy) to 1·62 per cent (cholecystectomy). This includes death from accidental causes, acute perforation, and gross infections. Excluding these cases, a mortality of less than 1 per cent can be shown.

With the passage of the stone into the common duct we no longer have a localized disease, but one fraught with grave dangers from liver infection and chokemia, and in this condition nearly 1 in 7 of our cases came to operation, while 1 in 25 developed malignant disease of the gall-bladder, or bile tract, and in most of these cases gall-stones were present. In other words, one patient in six had allowed the favourable time to go by, although the very large majority had ample warning in the early and safe stage for operation.

Dyspepsia Due to Gall-stones.—In my work on *Diseases of the Gall-bladder and Bile-ducts*, 3rd edition, I have pointed out that among the minor symptoms of cholelithiasis, dyspepsia holds an important place.

H. B. Day² remarks that several explanations have been advanced to account for the frequency of dyspeptic symptoms in cholelithiasis: they may be stated as follows:—

1. The dyspepsia is due to chronic gastritis, which has preceded and favoured the formation of gall-stones.
2. Adhesions are formed as the result of a local peritonitis around the gall-bladder, and set up "adhesion dyspepsia."
3. The symptoms are due to inflammation of the bile passages, with partial obstruction.

I would add another in the shape of chronic septicæmia, that so frequently accompanies cholelithiasis.

Moynihan³ has reported a case in which he treated a *simple stricture of the common bile-duct* with success by an operation essentially similar to that of Miculicz's pyloroplasty, by laying the stricture open longitudinally and stitching it up transversely.

Acute Perforating Ulcer of the Gall-bladder.—A case is reported⁴ of acute ulcer of the gall-bladder analogous to the acute gastric or duodenal ulcer. It occurred without any obvious cause, such as suppurative cholecystitis or gall-stones, and perforated, leading to death from peritonitis. The ulcer was circular and clean cut, about $\frac{1}{4}$ in. in

diameter, and situated near the fundus; the rest of the mucous lining of the gall-bladder was apparently healthy. The bile-ducts were patent and healthy, as was also the pancreas. The case appears to be unique.

REFERENCES.—¹*Ann. Surg.* Aug. 1906; ²*Pract.* 1906; ³*Brit. Med. Jour.* Nov. 25, 1905; ⁴*Arch. Pathol. Inst. Lond. Hosp.* vol. i. p. 24.

GANGRENE OF LUNG. *Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.*

This affection has been already mentioned as a result of bronchiectasis (q.v.), but there are left some points of interest contributed by observers. Clarke and Marine¹ adopt Traube's classification, viz.: According to its origin (1) In the blood-vessels, by a septic or non-septic infarct; (2) In the bronchi, secondary to putrid bronchitis, bronchiectasis, or the inhalation of foreign matter, liquid or solid; (3) In pre-existing disease of the lung parenchyma, such as pulmonary abscess, chronic pneumonia, tuberculosis, and traumatism. They then pass on to that form due to foreign bodies. They note (a) Its comparative rarity; (b) That organic substances are more common as causes than inorganic; (c) That rough, solid, organic bodies are the most fruitful causes; (d) That the usual stages of hepatization, necrosis, and liquefaction are not strictly adhered to, necrosis or even liquefaction not infrequently occurring as the first change; (e) That collapse of the portion of lung corresponding to the blocked tube begins first, with ulceration at the seat of the foreign body; that then the secretions from the ulcer set up putrid bronchitis, which goes on to hepatization, etc.

Nordmann² mentions hæmorrhage as sometimes a grave complication of gangrene, though it has not been dwelt on by other writers. He distinguishes two varieties: (1) The slighter, capillary form, which is not dangerous; (2) The copious form, from the erosion of a large vessel, which is almost always rapidly fatal.

André Bergé³ reports a case of recovery in a woman, who, having been resuscitated from drowning, developed pneumonia, and gangrene followed, from which she completely recovered in about ten weeks.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Mar. 1906; ²*Gaz. d. Hôp.* Aug. 2, 1906; ³*Bull. et Mém. Soc. Méd. Hôp. Paris*, June 23, 1906.

GASTRIC ULCER. (See STOMACH.)

GENERAL PARALYSIS OF THE INSANE. *C. C. Easterbrook, M.D.*

ETIOLOGY AND PATHOLOGY.—A. R. Diefendorf¹ states that amongst 172 general paralytics (137 men, 35 women, i.e., 3·9 men to every woman) admitted during the past seven years from the State of Connecticut into its Hospital for the Insane, the following was the frequency of the various etiological factors:—Syphilis 52 per cent, as against 9 per cent for all psychoses, including general paralysis of the insane; alcoholism 60 per cent, as against 34 per cent for all psychoses; head injury 23 per cent, as against 12 per cent amongst the total insane; defective heredity 41 per cent, as against 40 per cent amongst all insane. Physical and mental overwork, emotional stress, and

heat-stroke, were comparatively unimportant factors statistically. In the cases in which only one etiological factor was ascertained to have been present, the frequency was—alcoholism 20 per cent, head injury 10 per cent, defective heredity 10 per cent, and syphilis 7 per cent.

P. Näcke² holds that every general paralytic has an unstable brain, inborn or acquired.

A. Fournier³, one of the staunch upholders of the *syphilitic hypothesis*, claims that while cerebral syphilis begins most commonly three years after the chancre, general paralysis generally begins ten years after. Out of 79 cases, four had been thoroughly treated for syphilis for three to four years after the chancre; and only 3 cases had exhibited tertiary lesions, which Fournier regards as evidence of insufficient mercurial treatment; and, further, out of 243 cases of virulent syphilis, not one became a general paralytic. Hence Fournier recommends, for the prevention of general paralysis in syphilitic subjects, thorough antisymphilitic treatment, including not only administration of mercury, but also hydrotherapy, regular living, and avoidance of overwork and excess of all kinds, firstly for two years after the chancre, again during the fifth year, and, lastly, during the seventh or eighth year.

Christian⁴ states as weak points of the syphilitic hypothesis of general paralysis of the insane:—(1) The small percentage of syphilitics who become general paralytics; (2) A certain though small percentage of general paralytics with no history or physical evidence of past syphilis; (3) The long period that elapses in most cases, known to have had syphilis, between the onset of syphilis and the general paralysis; (4) The onset of general paralysis in certain cases, in spite of thorough antisymphilitic treatment; and (5) The failure of anti-symphilitic treatment to arrest or cure general paralysis. To these may possibly be added other three points:—(a) The absence of *Spirochæta pallida* in general paralytics; (b) The assumption that the syphilitic virus lessens the vitality and endurance of the nerve elements is not based on any direct evidence of the nature of nervous symptoms, such as might reasonably be expected at the time of syphilitic infection when the virus is apparently most potent; (c) The strong point, according to the syphilitic hypothesis, of the occurrence of general paralysis in juveniles with evidence of family or personal syphilis, and of no "stress" apart from that of development, does not exclude the possibility of some other as yet unrecognized infection, and the special susceptibility of the young to infectious diseases is well known.

A purely syphilitic causation would seem to indicate the necessity of: (1) An early period of mild action of the virus, with no characteristic nervous or mental phenomena; (2) A long middle period, during which the virus is dormant—a period long enough as a rule for the metabolic renovation of the cells and tissues of the body; (3) A late period of severe and fatal action of the virus, with characteristic nervous and mental symptoms; and (4) The ultimate incurability of syphilis by mercurial or other treatment.

The *Bacillus paralyticans* hypothesis of paresis and tabes was stated at some length in the *Medical Annual* last year, and it will only be necessary here to refer to the later work on the subject by Ford Robertson and Douglas McRae, as described by the former in his Morison Lectures⁵. These observers regard the diphtheroid bacillus of their researches as a special organism rather than as an attenuated form of the *Bacillus diphtheriæ*, and they have accordingly named it the *Bacillus paralyticans*, or the specific microbe of general paralysis and tabes. The *Bacillus paralyticans* has been obtained in living paretics and tabetics from the blood, cerebrospinal fluid, urine, and morbid genital discharges. In the same fluids during life, and also in the brain (in the adventitial spaces of inflamed cerebral vessels, and in the meshes of the pia-arachnoid) and lungs (in the alveoli and adjacent blood-stream at the sites of catarrhal pneumonic foci) of paretics dying of congestive seizures, granular rod-like bodies resembling the remains of diphtheroid bacilli which had undergone solvent action have also been observed, suggesting lysogenic or bacteriolytic properties towards the *Bacillus paralyticans* on the part of the blood and other fluids and tissues of the paretic. Robertson and McRae have studied experimentally the action of normal and paralytic blood upon *Bacillus paralyticans* isolated from cases of paresis and have demonstrated the occurrence of solvent, lysogenic, or bacteriolytic action, the dissolving bacilli losing their shape and affinity for stains, and becoming pale, faintly-tinted, attenuated rods, which ultimately break up. The serum of paralytic blood has a more marked solvent action upon *Bacillus paralyticans* than the serum of normal blood; and this action is attributed either solely to direct solvent properties of extracellular ferments (alexines or complements), or to the formation of specific inter-bodies or anti-bodies, which by combining with the bacilli render them more liable to the solvent action of the alexines in the serum.

More important, however, than the experimental reaction of blood serum is that of the polymorphonuclear leucocytes (phagocytes) of the blood. Here Ford Robertson distinguishes between: (1) The power of the phagocytes to take up, swallow, or incorporate the *Bacillus paralyticans*, a power which varies considerably in the case both of normal and paralytic blood, owing to variations in the "opsonic" power of the blood at different times, though Ford Robertson inclines more to Metchnikoff's theory of direct "phagocytic" activity than to Sir A. E. Wright's view of the formation of "opsonins" or substances in the serum which, by combining with bacilli, render them a more easy prey to the phagocytes. At the same time he is in agreement with the latter authority's demonstration of the wide fluctuations of the opsonic index in systemic infections. Ford Robertson, who gives a method of estimating the opsonic power of the general paralytic's blood serum, shows that it varies considerably, a point which may prove to be of special importance in the treatment of general paralysis by serums and vaccines. For diagnostic purposes, however, the power of the phagocytes to "swallow" the *Bacillus paralyticans* is

not so important as their power to "digest" them thereafter. (2) The power of the phagocytes to digest or dissolve the *Bacillus paralyticus*, a power which is considerably greater than in the case of normal blood, being probably due to the direct solvent action of intracellular ferments. The percentage of "digested" bacilli amongst those "swallowed" is termed the "*Intracorpuseular bacteriolytic index*," which thus serves as a guide to the phagocytic value of the paretic's blood. In 12 cases of general paralysis the index was considerably greater than in 6 controls—four times greater if an average index is struck for each of the two series. The "*opsonic*" power of a general paralytic's blood in relation to *Bacillus paralyticus* can be estimated under uniform temperature conditions (37° C.), by taking two samples of normal serum containing leucocytes, adding to both samples the same quantity of emulsion of *Bacillus paralyticus*, and to one sample a similar quantity of the general paralytic's serum to be tested, incubating both samples at 37° C. for forty minutes, making stained film preparations of both samples, and comparing the films of both as regards (a) The percentage of phagocytes containing bacilli; and (b) The average number of bacilli in each phagocyte. The opsonic power of general paralytic blood to *Bacillus paralyticus*, estimated by this method, varies considerably, but wide fluctuations were also observed with control normal bloods.

Agglutination of *Bacillus paralyticus* occurs as readily with normal as with general paralytic blood, and so this test does not provide a specific reaction for purposes of serum diagnosis. *Bacteriolysis*, however, of *Bacillus paralyticus* at the end of twenty-four hours is, as just mentioned, more marked with a general paralytic's serum, and especially with a general paralytic's phagocytes, than with the serum and phagocytes of a healthy person, the intracorpuseular bacteriolytic index being characteristically higher in paresis than in health. Further, for diagnostic purposes, from the blood, cerebrospinal fluid, urine, and genital discharge of the living general paralytic there can be obtained the *Bacillus paralyticus*, still active—or more or less altered by lyso-genic action—exhibiting in Neisser preparations no metachromatic granules as a rule, these, however, being marked in the bacilli obtained from the urine of tabetic cases, the appearances of the urinary *Bacillus paralyticus* therefore aiding in the differential diagnosis between paresis and tabes.

Hence, according to the *Bacillus paralyticus* hypothesis of paresis and tabes, these diseases are of the nature of a specific infection by the said bacillus, the usual sites of attack being the respiratory or alimentary tract in paresis, and genito-urinary tract in tabes. The *Bacillus paralyticus* obtains a footing, not on a healthy mucosa, only on a mucosa that is damaged as by chronic catarrh, but it remains as a saprophyte confined to the catarrhal mucosa, and exerting no important toxic influence so long as the local and general defences of the individual against bacteria remain effective. If these defences fail—as from ultimate atrophy of the catarrhal mucosa, and such factors as

excessive meat diet, alcoholism, syphilis, exhaustion from overwork, shock from injuries, and the like—bacillary invasion or infection, or toxæmia of the body occurs, this corresponding clinically to a congestive seizure in paresis, and possibly to a crisis in tabes. It is interesting to note that a congestive seizure, or a crisis, is not infrequently the first obvious indication of paresis and tabes respectively. The bacilli are carried by the lymph and blood to all parts of the body, being still subject to the bactericidal powers of the host; and the frequent fact of remissions in the course of paresis and tabes indicates that the paretic or tabetic still has considerable powers of self-defence through phagocytic activity, general cellular bacteriolytic properties, and the formation of specific anti-bodies. Many of the bacilli escape from the capillary circulation at either of two sites, the brain or the kidneys. In the brain, owing, probably, to structural peculiarities of the cerebral vessels and to chemiotactic influences of the nerve elements, the bacilli become lodged in the adventitial lymph channels, and undergoing disintegration give rise to a secondary local poisoning. The kidneys excrete the bacilli in the urine, as a result of which a cystitis—if not previously present—may arise, and in time form another site of infection from the bladder; and if the bladder wall becomes extensively invaded, the bacilli and their toxins may travel up the lymph sheaths of the spinal nerves to the spinal cord, giving rise to tabetic lesions and symptoms. In tabes the bladder or genito-urinary tract is probably the primary site of infection.

The earlier researches of the Ford Robertson school have been largely confirmed in America by J. D. O'Brien⁶, and also, so far as his observations go, by F. W. Langdon⁷.

Hans Evensen⁸ states that the pathological changes in the cerebral cortex of general paralytics are characteristically diffuse, though they may be intensified at certain sites, and that the only pathognomonic cortical change in paresis is infiltration of the adventitial lymph spaces by plasma cells. This change and the changes in the nerve cells, and to some extent in the medullated fibres, are probably equally due to the action of a toxic agent. The neuroglial overgrowth and, to a large extent, the degeneration of the medullated fibres, are probably secondary to the nerve-cell changes. The toxæmia of general paralysis, however, is not limited to the cortex, but implicates in more or less degree the rest of the brain and nervous system and the body generally, general paralysis being thus a general disease, a general toxæmia, possibly caused by the diphtheroid bacillus of Ford Robertson and his co-workers. He holds, however, that syphilis is in all probability a necessary antecedent, and concludes that both factors are required for the evolution of the disease.

PROGNOSIS.—W. J. Mickle⁹ claims that general paralysis may terminate in recovery, in death, or in "chronic mental defect or disease," and the subject may die many years after of some intercurrent affection, but practically recovered, so far as physical symptoms during life are concerned. G. Greene¹⁰ states that the

points in favour of a long duration of general paralysis are female sex, youth, and degenerate type of subject, fixed delusions, pupils reacting normally to light, early optic atrophy, and early tabes; whereas the points in favour of a short duration are male sex, age thirty-five to forty, and non-degenerate type of subject, melancholia or early dementia, and pupils sluggish or inactive to light, or exhibiting frequent and rapid variations in size, or actual hippus.

TREATMENT.—The prophylactic treatment, as advocated by Fournier, has already been referred to, and means that every person who contracts syphilis must thereafter lead a well-regulated life, avoiding excesses and overwork of all kinds, and for the first and second year after the chancre, again during the fifth year, and again during the seventh or eighth year, must take full courses of mercury and hydro-therapy.

Antisymphilitic treatment fails to arrest or cure paresis, which is still regarded as a fatal disease. However, the Ford Robertson school researches indicate a hope that arrest or cure of the disease may be effected by administration of an **Anti-serum**, containing the specific bacteriolytic anti-bodies as manufactured by lower animals; or by **Vaccine Treatment**, in which emulsions of living *Bacillus paralyticans* in carefully graduated doses, and with due regard to the phase of opsonic power, are introduced hypodermically, so as to stimulate the patient to produce sufficient anti-bodies to effectually arrest or cure the disease. Both these methods are at present being tried from the Scottish Asylums' laboratory. The writer has tried vaccine treatment in 4 male and 2 female typical general paralytics; the vaccine being supplied from this laboratory, but so far without benefit. R. E. French¹¹, writing on opsonic factors, states that treatment by vaccines stimulates the system in its resistance to infection, not in acute infectious, only in chronic localized infections, but as a rule is insufficient to effect a cure so long as a focus or foci of infection remain, which, therefore, must be remedied so far as is possible. Herein lies a difficulty in the vaccine treatment of paresis and tabes, in which by the *Bacillus paralyticans* hypothesis there is both a localized and a systemic infection; but this point serves to emphasize the importance of combining the vaccine with active local treatment by means of internal antiseptics and other remedies for the amelioration of any morbid condition of the respiratory, alimentary, or genito-urinary mucosa.

REFERENCES.—¹*Brit. Med. Jour.* Sept. 29, 1906; ²*A ch. f. Psy h.* 1906, Bd. xli. Hft. 1; ³Masson & Cie. Paris, 1905; ⁴*Progrès Méd.* April, 1905; ⁵*Rev. Neur. and Psych.* Feb. Mar. and April, 1906; ⁶*Amer. Med.* Sept. 23, 1905; ⁷*Amer. Jour. Insan.* Oct. 1905; ⁸*Rev. Neur. and Psych.* Aug. Sept. 1906; ⁹*Brit. Med. Jour.* Sept. 29, 1906; ¹⁰*Jour. Ment. Sci.* April, 1906; ¹¹*Pract. J.* July, 1906.

GLANDERS.

E. W. Goodall, M.D.

In the last number of the *Annual* we gave a short account of two cases of glanders to illustrate how easily the disease may be mistaken for typhoid fever, rheumatic fever, pyæmia, and other acute febrile diseases. Louisa Woodcock¹ has published a similar case. The

patient was a man, aged thirty-seven years, a porter in the meat market. The illness began on December 1st with pleurisy, which lasted ten days. The man then resumed work, but on December 16th, while out walking, was suddenly seized with severe pain in the left leg, for which he was treated for three weeks as a case of acute rheumatism. He was then sent to a hospital, where he was found to have subcutaneous and intramuscular swellings. Other joints became affected, and cellulitis and pustules appeared in different places. The patient died comatose on January 24th. From fluid obtained from the right knee joint on January 23rd, the *Bacillus mallei* was obtained.

REFERENCE.—¹*Lancet*, Feb. 3, 1906, p. 288.

GLAUCOMA.

A. Hugh Thompson, M.D.

The treatment of chronic glaucoma by **Iridectomy**, though probably more efficient than any hitherto adopted, leaves much to be desired. To free the angle of the anterior chamber may be impossible, or the angle itself may be partially impervious. In these cases it is desirable to establish a pervious cicatrix in the sclerotic itself, but this must be free from the danger of conveying infection into the interior of the eye which exists with those cystoid cicatrices which sometimes follow an adhesion of a portion of iris. A sclerotomy, as usually performed, is no more efficient than an iridectomy: there is therefore undoubted room for an improvement of procedure. Lagrange¹ advocates a combined iridectomy and sclerectomy, performed as follows: Physostigmine having been applied to the eye, an incision is made by means of a narrow blade in the sclera parallel to the upper edge of the cornea at some little distance from the latter, freeing the filtration angle as exactly as possible. In making the section, the blade is rotated, so as to turn the cutting edge of the instrument a little back. In the result, therefore, the sclera is bevelled. When the section has reached the conjunctiva, the blade is turned definitely backwards, for the purpose of cutting a large conjunctival flap. The flap of mucous membrane being turned forwards over the cornea, the next step is to resect, by the aid of a small-toothed forceps and well-sharpened and strongly-curved scissors (made by Lüer, of Paris), a small piece of the sclera left attached to the cornea. Lastly, an iridectomy is made as usual, a large piece of iris being removed in two stages up to the angle of the chamber.

REFERENCE.—¹*Arch. d'Ophthalmol.* Aug. 1906, and *Ophthalm.* Oct. 1906.

GONORRHŒA. (See also SERUM-THERAPEUTICS.)

J. W. Thomson Walker, M.B., F.R.C.S.

Baer¹ draws attention to an affection associated with gonorrhœa, and characterized by a painful bony outgrowth at the tubercle of the os calcis, just in front of the attachment to the plantar fascia. Six cases of such exostosis are given, and in five of these there was a definite history of gonorrhœa. In the sixth, gonorrhœa was denied, but there was a history of suppurating bubo, and a pure culture of the gonococcus was obtained from the operation upon the heels. In

two cases, cut sections were stained for gonococcus, and organisms resembling them were found. Pain was the chief symptom. It was sharply limited to the attachment of the plantar fascia, and was elicited on pressure. Examination showed a thickening of the periosteum on both sides of the os calcis. The gait was characteristic, the patient walking on the ball of the foot. In some instances, pain was found in the back, due to exostoses alongside of and between the vertebræ. The typical symptoms of osteo-arthritis of the spine were produced. The diagnosis depended upon the history. The affection appeared in young males from three to nine months from the beginning of an attack of gonorrhœa. It was bilateral. Radiographs showed distinct bony outgrowths. In the five cases, relief from pain was obtained by excision of the exostoses.

Barker² relates the case of a man suffering from bilateral exostoses on the inferior surface of the os calcis, which he considered were gonorrhœal in origin. The case was similar to those described by Baer. Radiographs showed the exostoses which had "the typical 'worm-eaten' appearance so often found in these cases." The proof of a gonorrhœal origin in this case is, however, very slender.

Schwetz³ describes a case of cellulitis due to the gonococcus. The patient, a young woman of 18 years, suffered from diffuse redness in the dorsum of the right foot. The entire dorsum of the foot was oedematous and tender, and there was well-marked fluctuation above and below the tibiotarsal articulation. There was slight swelling of the inguinal glands, but no lymphangitis. The temperature was 101.3° F. On incision, a quantity of thick yellow pus escaped. A vaginal discharge was present, with inflammation of the appendages. The pus contained the gonococcus only. The writer collected 11 cases of gonorrhœal cellulitis of pyæmic character.

Becker⁴ describes three cases of gonorrhœa with unusual complications. In one a suppurative myositis occurred in the flexor muscles of the forearm. This healed quickly after incision. The pus contained gonococci. In the second case, a pericarditis with comparatively large effusion, which pursued a benign course, complicated an acute gonorrhœal prostatitis in a young man. The third case was that of a young woman who suffered from gonorrhœal cystitis, and after a severe instrumental labour, suffered from arthritis of the sacro-iliac synchondroses and the symphysis pubis.

Apert and Froget⁵ demonstrated a case of gonococcic inflammation of the scalp, at the Société de Pédiatrie of Paris.

TREATMENT.—F. A. Lyons⁶ describes what he prefers to call the "**Quick Curative Treatment.**" The suitable cases are as follows: If gonococci are found, and the history of the case shows it to be one of acute infection, and if there are a fair proportion of epithelial cells present in the secretion, he deems it a good case for the "quick curative plan of treatment." To this he adds, that if there is a fair proportion of cells present (on which colonies of gonococci are seen), the treatment may be expected to be successful.

The method is as follows :—The patient passes water, and the surgeon injects $1\frac{1}{2}$ dr. of a 4 per cent solution of nitrate of silver into the urethra with an ordinary syringe; the meatus is then held so as to retain the solution for two or three minutes. The gonococci may have disappeared in 24 hours, and if so nothing further is done. If gonococci are still present, $1\frac{1}{2}$ dr. of a two per cent solution of silver nitrate is injected, and the patient re-examined in 24 hours. If the gonococci have not disappeared, a third injection of a 1 per cent solution may be used, but if this fails to cause disappearance of the gonococci, it is useless to proceed further with the method, and the "symptomatic plan" is adopted. By this means the author claims to have cured the disease in six days in 95 per cent of over 400 cases. This plan, he states, differs entirely from "the old abortive plan" both in theory and in practice. The author does not state wherein the difference consists, but he says that "the new one is entirely scientific, perfectly controllable, theoretically perfect, and practically based on the well-founded facts of pathological anatomy which modern methods have established. It is thought out and developed upon the lines of the pathogenesis of the disease." This is very high sounding, but it must be confessed that the difference from the "old method" is so slight as to be non-apparent to the average mind.

Vogel, of Berlin⁷, writes on the *prophylaxis and abortive treatment* of gonorrhœa. For prophylaxis **Silver Preparations** have been used. Protargol, either as a solution or in gelatin in a strength of from 4 to 20 per cent, has now replaced the silver nitrate 2 per cent solution. Although this is frequently successful, a certain amount of scepticism prevails. On the one hand, it is not possible to produce exact proof of the strength of the prophylaxis, and on the other, a severe irritation of the urethra has been caused by the prophylactic material. Success is only to be obtained if the process has not yet penetrated beyond the surface layer of epithelium. Several drugs are recommended in such cases, of which silver nitrate is the best, in solution of 1 to 3 or 5 per cent, either in the form of painting with the endoscope or by instillation. Another method is Janet's irrigation. This the author considers a source of trouble both to the patient and to the practitioner, and there is, he considers, a danger of sweeping gonococci back into the deeper parts of the urethra. Köster and Jadassohn's ammonium sulpho-ichthyolate has scarcely been used as yet, but the new silver preparations are very suitable, namely, argentamin, argonin, protargol, largin, albargin, and ichthargan. The author prefers protargol. He injects 10 cc. of a 4 per cent solution into the urethra, and this is retained for one to two minutes. Preferably on the same day, he washes out the anterior urethra with boric acid or potassium permanganate. According to the amount of irritation, this is repeated on two or three succeeding days. The author is by no means an ardent advocate of abortive treatment, which is only successful in particularly fortunate circumstances. Complications occur, and are particularly troublesome.

Berg⁸ relates his experience of the abortive treatment in 47 cases. Two or three irrigations of a silver nitrate solution of 1-500 at intervals of ten to fourteen hours were frequently sufficient to cause disappearance of the gonococci. In 67 to 78 per cent of cases the treatment was successful. The presence of posterior urethritis, of inflammation of the external meatus, and the longer duration of the gonorrhœa than two days, are contra-indications.

Bierhoff⁹ used Janet's irrigation method, usually with protargol ($\frac{1}{6}$ - $\frac{1}{2}$ per cent) as the solution. He was successful in aborting the gonorrhœa in 15 out of 30 cases. There were no serious complications.

In discussing the treatment of acute gonorrhœa, Christian¹⁰ states that in his hands "efforts to abort gonorrhœa have hitherto invariably failed, and the patients have subsequently stated that, should they ever be unfortunate enough to again contract the disease, they would infinitely prefer to allow it to pursue its natural course rather than undergo the ordeal of having an attempt made to abort it." This is by no means the universal opinion, however. This author also condemns Janet's method of irrigation of the urethra by means of a douche-can and glass nozzle. He describes the method as "consisting in the injection into the urethra, under pressure, of strong solutions of permanganate of potash." This method, he says, has "lately fallen into disfavour on account of the injury inflicted upon the urethral mucous membrane. The majority of cases progressed very favourably, as far as diminution in the urethral discharge was concerned, up to a certain point, when the discharge would be mucopurulent in character, with a slightly clouded urine; but beyond this point no further advancement was to be had."

[The description gives quite an erroneous idea of the method, a short account of which appeared in the *Medical Annual* for 1905. The solutions of permanganate of potash used are weak, and injury to the mucous membrane is less likely to occur here than in other methods of treatment.—EDITOR].

Christian finds the exclusive use of internal remedies sufficient to cure an attack of gonorrhœa.

He, however, usually adheres to the combination of "internal administration of remedies with the employment of hand injections in the urethra." The internal remedies comprise **Diuretics** and **Sedatives**, in the early inflammatory stage of the disease, such as bicarbonate of potash, acetate of potash, bromide of potash, monobromate of camphor; **Urinary Antiseptics** such as urotropin, boric acid, and salol; and **Antiblennorrhagic** remedies, such as balsam of copaiba and oil of sandalwood. In the early stages of the affection he employs locally a solution of **Permanganate of Potash**, 1-8000, and a solution of some **Silver Salt** (protargol, 1 per cent; albargin, 1 per cent; argyrol 5 per cent). The patient is instructed to flush out the urethra three times daily with four syringefuls of the permanganate solution, this being immediately followed by one syringeful of the silver solution, which should be held in the urethra for ten minutes. Towards the end of

the second week, the strength of the solutions may be increased. This treatment will not alone cure the disease. In the terminal stage, a catarrhal urethritis remains, which requires for its treatment **Astringent** remedies. The following is a useful injection at this time:—

R	Zinc. Sulph.		Liq. Hydrast. (colourless)	℥ss
	Pulv. Alum.	āā gr. xij	Aq. dest.	℥iv

Tausard¹¹ uses **Collargol** in acute gonorrhœa in a solution of 1-50 for irrigation twice daily. In chronic urethritis he instils 2 cc. of a 4 per cent solution. In very old cases, where the inflammation has penetrated deeply into the mucosa, he commences with massage on a steel instrument. He follows this by irrigation and then instillation, and compresses the urethra with a thread at the base of the glans so as to allow the collargol to act for hours. In all old cases the gonococci disappeared with less than 30 instillations. At the commencement of the treatment a temporary increase in the discharge was sometimes seen. The author treated cystitis with daily instillations of 3 to 4 cc. of a 4 per cent solution, and cured five out of six cases in less than eight days. Besides its marked influence on gonococci, collargol has, according to this author, the following advantages: Absence of irritation in the urethra and bladder, painless treatment, and the impossibility of cauterizing the urethra in stronger solutions.

Renault¹² describes the action of **Gonosan**, a remedy for internal use in gonorrhœa. The drug was first used by Dr. Boss, of Strassburg, in 1902. It is an oily fluid, containing a solution of resins of kawa-kawa root and sandal wood. Gonosan is said to be prepared with the finest sandal-wood oil, free from the impurities which cause nausea and lumbar pain. Kawa is prepared from a species of pepper plant, the *Piper methysticum*. Lewin, of Berlin, showed that the resin produced a diminished sensibility of mucous membrane by direct application. He also obtained from the urine, where kawa had been taken, a substance which produced anæsthesia of the eye. He further observed that a certain degree of ischæmia of the mucous membrane was produced by contact with the resin. Finally, a certain diuretic action was ascribed to the drug by Lewin and Roger. Von Zeissl, of Vienna, used the drug in gonorrhœa in 1879, but with little success in regard to its influence on the discharge. Dr. Boss suggested the association of the two drugs, so that the properties of both might be obtained in the treatment of gonorrhœa. The properties claimed for gonosan are sedative, anticatarrhal, and bactericidal actions. The sedative action is specially valuable in reducing the painful night erections. The drug is said to diminish the amount of discharge and to cause disappearance of the gonococci. It is well borne, and does not cause indigestion or lumbar pain.

S. Jacoby, of Berlin¹³, suggests a novel treatment for gonorrhœa. He has invented a **Suction Apparatus** by means of which he treats the urethra with the **Venous Hyperæmia** method of Bier. He describes the instrument as consisting of a metal tube 12 cm. long and about 21 charrière size. Along the surface of this sound run three grooves.

which do not reach to either end, and the edges of which are smooth and rounded; on the floor of the grooves are five small openings which lead into the inside of the sound. A rubber ball is fixed at right angles to the proximal end of the tube, and communicates with the hollow interior, a stopcock being provided. The hollow sound is introduced into the anterior urethra, and the wedge-shaped proximal end fills up the meatus. The author places an elastic band around the penis at the base of the sulcus. The rubber ball is emptied of air, and the stopcock turned so that a vacuum is formed inside the tube. The instrument was left in the urethra for 10 to 15 minutes, and caused no pain. As only the strips of urethra over the grooves are affected, while the parts between are untouched, the instrument is used in a different position, as shown by the horizontal or vertical position of the rubber ball, on subsequent occasions. Jacoby uses this instrument only in the anterior urethra, and in sub-acute cases with little discharge, or in chronic cases.

Ballinger¹⁴ recommends the use of **Medicated Sounds** in chronic urethritis. The sounds are prepared in the following manner: Silver nitrate (30 to 45 gr.) is powdered and mixed with melted cacao butter (6 oz.), which is placed in a tall wide-mouthed bottle; this should be sterilized occasionally by boiling in a water-bath. Before use the bottle is placed in hot water to melt the cacao butter. The largest sound that can be easily passed, and another three sizes smaller, are sterilized and placed in a pitcher of iced water. The large sound is lubricated and introduced, and is left in place for 3 to 8 minutes; the smaller one is dipped in the melted ointment, withdrawn, and manipulated for a minute while it cools, and is then placed in the iced water. The cold hardens the cacao butter, and it may be introduced before it melts, while the canal is cool from the larger sound which was first passed. Gentle massage is used along the urethra. Intervals of from one to four days are allowed between the treatment, according to the reaction.

Routh¹⁵, in a clinical lecture on gonorrhœa in women, recommends the following treatment for the acute form. "As soon as the acute stage is a little lessened, an attempt should be made to stop the further progress of the disease; after douching the vagina, pass a duckbill speculum and draw down the cervix, the patient being by preference under anæsthesia; then apply strong **Iodine** solution—the liquor (1-9), or better still, a stronger solution (1-4)—to the endocervix as far as the internal os. This can be done through a Fergusson's speculum if preferred. Having in that way purified the cervix, the object being to kill the gonococci, you then apply **Nitrate of Silver** solution, about a drachm to the ounce, to the whole of the vagina. After seeing that every part has been touched with this solution, withdraw the speculum gradually and paint the whole of the vulva in exactly the same way." The urethra then receives attention; the treatment of this is painful, and the author recommends the application of pure carbolic acid on Playfair's probe on account of its anæsthetic

action. "This method of treatment will often cure a patient at one sitting. Sometimes the procedure has to be repeated in five or six days."

Valentine¹⁶ gives the following **Tests of Cure** after an attack of gonorrhœa. (1) Stripping the urethra, preferably before the patient has passed his first morning's urine; if any excess of urethral secretion is obtained by such stripping, microscopic examination and cultures are made of it. (2) Even if the first urine in the morning is perfectly clear, sedimenting or centrifuging it, and using the sediment for microscopy and culture. (3) Rammage, whereby adherent secretions are carried from the urethra on the shoulder of the bougie-à-boule; these secretions are then used for microscopy and culture. If rammage fails, the urethra is curetted with a sterilized platinum loop as advocated by Lewin, of Berlin. (4) The Kollmann 5-beaker test for residual posterior urethritis. (5) Expression urine (Posner), obtained by causing the patient to urinate after expressing the contents of the prostate and the seminal vesicles. This urine is then treated as under the second heading. (6) The juice expressed by massage of the prostatic and seminal vesicles is used for cover-glass smears and cultures. (7) The beer test or champagne test, which will produce a recrudescence of discharge in some cases: the presence or absence of gonococci in this should be ascertained by microscopy and culture. (8) Urethroscopy.

Hirsch¹⁷ treated 25 cases of *gonorrhœal arthritis* with the **Venous Congestion** method of Bier. Some of the cases were healed by this method alone, others partly by other means. Nine times the arthritis was non-articular, and five of these occurred in one knee. In two cases both knees were affected. The congestion was in most cases commenced at the very beginning of the disease. In two cases it had to be stopped on account of great pain; in other cases the pain soon ceased. The treatment was carried out by means of an Esmarch's bandage, or a thick rubber tube with chain attachment. It was usually applied twice daily, at first for a few minutes, later for two, or at the most three hours. Between these times, wool packing or poultices were applied on the skin, painted with iodine solution. As soon as possible, often after a week, passive movements were begun, soon followed by active movements. Of the 25 patients, 10 were completely cured, in 5 there remained a thickening of the capsule and a feeling of weakness, in 4 there was slight stiffness, and 6 were unrelieved or only improved; in only 1 case did complete stiffness remain. The cases showed joint pain without effusion or serous or seropurulent effusion. In none of them was peri-articular inflammation present. In comparison of the results of the congestion treatment with that previously in use, the former showed no advantage either in the duration of the trouble or in regard to the function of the joint. It was noted, however, that the time during which the congestion was used was shorter than that recommended by Bier.

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GOUT (Chemical Pathology of).

Robt. Hutchison, M.D.

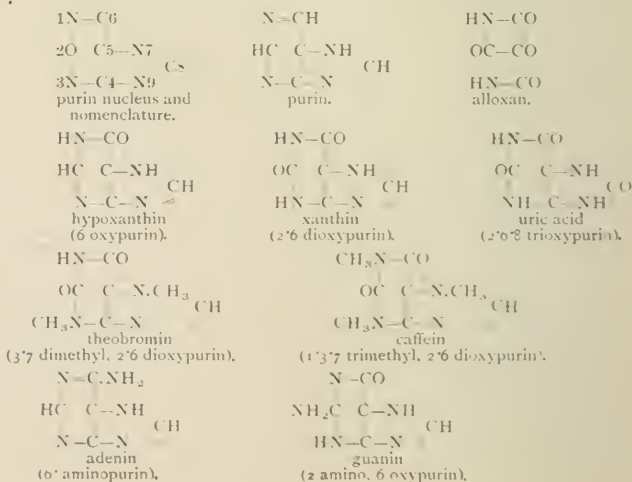
There is still so much confusion about the pathology of gout, and the part which uric acid plays in its causation, that it is worth while to reproduce the following admirable summary of the subject which was published by H. L. Tidy, in the *London Hospital Gazette* for February, 1906:—

Since the days of Sydenham, the pathology of gout has been a favourite question in the dialectics of medicine. The essential points which are undeniable are, the presence of an excess of uric acid in the blood, and the deposition of sodium biurate in the articular and other tissues of gouty individuals. No other point is beyond discussion, and neither of these is pathognomonic of gout. Many observers at the present time are looking towards creatinin and similar substances in the search for the *fons et origo mali*. It is possible that they are right, but the connections of uric acid and its allies with gout are so widespread and important that these remarks must be confined to the biochemistry of the purin bodies.

THE PURIN BODIES.

Uric acid, xanthin, and all the "alloxur" bodies owe their relationship to the possession of a common skeleton, namely, the heterocyclic ring called by Fischer the "purin nucleus."

The connections of these substances are seen in the structural formulæ:—



Uric acid was discovered in 1776 by Scheele, who isolated it from the urine. Wollaston, in 1787, showed that the deposits in gouty tissues consist of urates. In 1847, Sir Alfred Garrod detected urates in the blood of a gouty individual, and their constant presence in gout has since been proved. The close relationship of uric acid to urea is seen in the constitutional formula. It may be regarded as two urea radicles united by a tricarbon chain. By a process of oxidation and hydrolysis, two molecules of urea may be obtained from one molecule of uric acid, and, conversely, uric acid is produced by the condensation of urea with hydroxy acids. The syntheses of uric acid from urea and trichlorolactamide ($C Cl_3 CHOH CONH_2$), and from urea and glycocoll ($CH_2 NH_2 COOH$), are of importance owing to the occurrence of lactic acid and glycocoll in the organism. Certain ferments, which exist in and can be extracted from the liver and spleen, have the power of converting these purin derivatives into uric acid. The methyl purins form an exception to this, the organism being unable to produce uric acid from caffeine or theobromine. Germans have looked on purin as the union of a urea radicle with an alloxan (or more properly pyrimidine) nucleus. This has led to purin derivatives being called "alloxuric" bodies.

We will now consider some of the main questions arising in the pathology of gout.

I. THE ACCUMULATION OF URIC ACID IN THE BLOOD.

Three causes are possible. It may be due to: (1) Over-production of uric acid in the ordinary seats of its formation with normal excretion: (2) Diminished destruction of the uric acid formed, with normal excretion: (3) Deficient excretion by the kidneys with normal production.

Experimentally, over-production can be imitated by the subcutaneous injection of uric acid. Physiologically, over-production may result from excessive ingestion of purin bodies or from increased formation in tissue metabolism. The former is the cause of the presence of urates in the blood following excessive thymus feeding, the latter is supposed to be the cause in leucocythæmia and certain other conditions in which urates can be detected in the blood. In all these cases, over-production is accompanied by increased excretion, showing that normal kidneys can excrete more than the usual amount of uric acid when larger quantities are presented to them. If then over-production occurs in gout, it should be reflected by an increased excretion, but prolonged examination has shown that the excretion of uric acid in gout does not exceed that of normal individuals. The same argument applies to the suggestion that diminished destruction of uric acid occurs. Deficient excretion by the kidneys is thus the only possibility which is compatible with the observed phenomena of gout. Direct determinations have also shown that the excretion of uric acid by gouty patients is distinctly below that of healthy individuals on a similar diet. (Pfeiffer, Luff). Retention, and not over-production, may therefore be considered to be the actual cause of the excess of urates in the blood.

II. THE SOURCE OF THE PURIN BODIES.

Paroxysms of gout never occur when urates are absent from the blood. Reduction in the amount of these urates, as a step towards their extinction, is thus of importance, and for this purpose a knowledge of their source is necessary. In diabetes, the somewhat similar problem with regard to glycosuria has been partially solved. Assuming that the urates in the blood owe their presence to deficient excretion, their origin must, in the main, be the same as the origin of the urates in normal urine.

The source of these urates and other purin bodies will now be considered. The ingestion of certain substances has been found to cause an increased excretion of purin bodies in the urine. The problem of tracing their course between ingesta and excreta is complicated by several difficulties. Firstly, although purins can be recognized in food and in urine, no purin bodies can be found in normal blood. Secondly, the purins in urine have not all the same origin. Thirdly, results obtained from experiments on birds and serpents cannot be applied directly to mammals.

Three sources must be considered for the origin of purin bodies in the urine: (1) Synthetic formation in the organism; (2) Exogenous origin. Purin bodies taken into the organism with the ingesta; (3) Endogenous origin. Purin bodies formed by breaking down of the tissues.

1. *By Synthesis.*—This process undoubtedly occurs in birds. The administration of urea and many other substances results in an increase in the uric acid excreted. In mammals the purin excretion remains almost constant on a purin-free diet, even when enormous variations are made in the quantity and nature of the ingesta. However, a few chemical substances, which are not purins, do cause a perceptible, though slight, increase in the purin excretion of mammals. These substances cause a very marked increase in birds. They are oxyketone and dibasic fatty acids, and of them lactic, tartronic, and β -oxybutyric acids are most effective. Probably then, a certain small percentage of urates excreted have a synthetic origin.

Following Horbaczewski's preparation of uric acid from glycine and urea by laboratory methods, it was suggested that a similar synthesis was accomplished by the kidney. It was said that glycocholic acid secreted in the bile was decomposed in the intestine, and the glycine absorbed into the portal circulation. Some of this passed into the systemic circulation and reached the kidney. In support of this, it was pointed out that the bile of carnivora, which excrete no uric acid, contains taurocholic and not glycocholic acid. On this theory, the presence of urates in the blood was ascribed to the kidneys being unable to excrete the uric acid which they formed, and its subsequent solution by the blood. Against this is the fact that glycine and urea, administered in excess to mammals, cause no change in the uric acid secretion.

The researches of Wiener point to glycine being a decomposition product rather than a precursor of uric acid, and it is more probable that lactic acid takes part in the synthesis. Whatever be the origin of this portion of the urates, they form but a small proportion of the total.

2. *Exogenous Purins*.—Twenty years ago it was believed that the metabolism of any proteid gave rise to uric acid. The argument on which this was based is now proved untrue. On a flesh-free diet, the uric acid excretion remains constant, while the excretion of urea rises and falls with the amount of proteid ingested. Von Noorden has found that in the same person under different diets the proportion may vary between 1 : 23 and 1 : 122.

It is now known that only certain food-stuffs cause an increase in purin excretion. These may be divided into three groups:—

(a) *Oxypurins*, i.e., xanthin and hypoxanthin. These occur in muscle, and are present in considerable amount in meat extract. Minkowski discovered that the administration of xanthin bases caused a marked increase in the uric acid excretion.

(b) *Amidopurins*. Subsequent to Minkowski's discovery of this action of xanthin, it was found that a distinct increase in the purin excretion followed the ingestion of certain animal food-stuffs, especially thymus and pancreas, which contain in simple extract only negligible amounts of xanthin bases. The work of Kossel and Horbaczewski proved that this increase was due to the metabolism of nuclein, the decomposition products of which include adenin (from thymus) and guanin (from pancreas), both amidopurins. Further researches have shown that all nuclein-containing food-stuffs influence the uric acid excretion according to the amount and nature of the nuclein which they contain.

(c) *Methylpurins*. Caffeine and theobromine are the only methylpurins of importance. The ingestion of these raises the total purin excretion, but it should be noted that it does not influence that of uric acid.

To sum up, exogenous urinary purins may be derived from any nuclein, and from certain free xanthin bases. No other nitrogenous foodstuff has any influence which need be considered.

3. *Endogenous Purins*.—In order to determine what amount of the purins excreted are derived from the tissues of the body, the organism must be kept on a purin-free diet. The food-stuffs which are absolutely purin-free are carbohydrates, pure fats, and eggs, but milk, white bread, and potatoes contain only minute traces, which have been shown to exercise no appreciable influence on the urinary purins. Therefore, it is possible to frame a purin-free diet which contains an adequate amount of nitrogen and a sufficient number of calories, that is to say, a diet which is practically normal and yet purin-free. The continued excretion of purins on such a diet proves the existence of an endogenous moiety, due to metabolism of the tissues. The purin bodies contained in animal tissues are amidopurin

(adenin and guanin) combined with phosphoric acid in nuclein and oxypurins (xanthin and hypoxanthin), which are most abundant in muscle. Nuclein and muscular tissue are, therefore, two sources from which endogenous purins might be derived.

(i). *Nuclein*.—The destruction of leucocytes supplies a constant source of nuclein disintegration. It has, however, been shown that the number of leucocytes and the excretion of uric acid do not always vary directly. Thus, in gout itself there is no leucocytosis, and Dr. Hutchison and Professor MacLeod have recorded cases of leucopenia without any reduction in the amount of uric acid. Also, it must be noted, that on a diet approximating to Voit's standard, about $\frac{1}{5}$ gram of purin is excreted daily. This corresponds to nearly 100 grams of such a tissue as thymus, and it is highly improbable that cellular metabolism can exist to such an amount. Nuclein disintegration is now regarded as an important, but not the sole, source of endogenous purins.

(ii). *Muscle*.—A large increase in the excretion of purin bodies has lately been found to follow muscular exercise. Also hypoxanthin has been found in defibrinated blood after perfusion through the hind legs of a dog, the muscles of which have been thrown into tetanus, and the muscles themselves, subsequent to contraction, contain an increased amount of oxypurins. Burian, from these experiments, concludes that hypoxanthin is a product of muscular action. It may be recalled that synthesis of purin bodies is easily carried out by laboratory methods from urea and lactates.

The following conclusions, arrived at by Burian and Schur, Folin, and other workers, may be mentioned.—(a) The exogenous and endogenous moieties are mutually independent; (b) the exogenous moiety depends in amount solely on the diet; (c) the endogenous moiety varies with each individual, but for any given individual is constant, irrespective of diet, in similar physiological conditions (e.g., of muscular exercise); (d) Of oxypurins ingested one-half, of amidopurins one-quarter, and of methylpurins one-third is excreted as purin. These proportions are constant for the human race, but vary for every species of animal.

III. VARIATIONS IN PURIN EXCRETION OCCURRING IN GOUT.

In chronic gout the endogenous purin excretion is on a par with the lowest average of healthy individuals. The administration of thymus is followed by an increased excretion, but not to the same amount as occurs in health. These observations suggest that the retention of urates applies both to endogenous and exogenous purins. During an attack of acute gout the excretion of uric acid diminishes to a low level between the paroxysms, rises to within normal limits shortly after the onset of a paroxysm, and then again subsides. The administration of sodium salicylate produces an immediate rise of 30 to 60 per cent in the uric acid excretion. This increase then diminishes, and generally returns to normal in about 48 hours, whether

the salicylates be continued or not. The increase in total nitrogen excretion is less than 10 per cent. This phenomenon is similar in gouty and healthy individuals, and the estimations of Walker Hall and Magnus Levy, from gouty individuals, on meat diet and purin-free diet, and from healthy vegetarians, suggest that this increase is due to diminution in the normal destruction of purins in the organism, and the resulting presentation to the kidneys for excretion of larger amounts. During the constipation so common in gout there is usually a rise in the purin excretion, which disappears immediately the fæces are passed. It is possible that constipation, like salicylic acid, is associated with diminished oxidation of uric acid. It is difficult to regard the increase occurring with constipation as the result of a beneficial action.

IV. THE RETENTION OF PURIN BODIES IN GOUT.

Admitting that the urates in the blood are due to deficient excretion, the question of the cause of this retention arises. Two possibilities present themselves. (1) It may be due to a primary defect of the kidneys, a view which regards gout as a manifestation of renal inadequacy. (2) It may be due to some abnormality in the form of the uric acid which is presented to the kidney for excretion.

1. *The Renal Origin of Gout.*—The frequent association of renal lesions with the phenomena of gout is undoubted. From three aspects, the close connection between them is seen. Firstly, in cases of chronic interstitial nephritis, von Jaksch and Klemperer have shown that urates are always present in the blood. Also, post-mortem examinations of cases known not to have had gout, show that in 50 to 80 per cent deposits of urates exist in the joints. Secondly, in undoubted cases of gout, interstitial nephritis is very commonly found post mortem. Many competent observers consider that it is invariable. Thirdly, certain toxic substances cause both gout and interstitial nephritis. Of these, lead is conspicuous. The medicinal use of lead acetate results in a great diminution of urates excreted in the urine, an observation consistent with the view that lead inhibits the excretory power of the kidney for uric acid, the change being at first functional, and later organic. It should, however, be remembered that the frequent association of gout and chronic lead-poisoning which exists in London is not seen in the north of England or in America. Against the renal theory, it is urged that paroxysms of gout often occur for many years before the symptoms of interstitial nephritis develop, and that in gouty families acute attacks may be seen at an age at which interstitial nephritis is practically unknown. To this, the reply can be made that there is evidence that interstitial nephritis can be present without giving rise to recognizable signs.

2. *The Form of the Uric Acid.*—It has been mentioned above that in the blood in health, purin bodies are not appreciable, although the administration of them by the mouth is followed by an increase in the excreta. To account for this, Minkowski suggested that purin bodies

circulate in a combination which prevents them from giving the usual reactions. This may be compared with the masking of arsenic and iron in the cacodyl compounds and the ferrocyanide ion.

Von Noorden has elaborated this suggestion as follows : The normal organism has at its disposal a certain number of organic substances which can combine with uric acid and render it soluble. This combination passes through the blood to the kidneys, which eliminate from it the uric acid. In gout there is a deficiency of these substances, which results in uric acid being turned into the blood as urates, a form in which elimination only proceeds with difficulty. The purins are thus supposed to circulate normally in organic combination, and abnormally as salts of sodium.

It may be noted that Burian and Walker Hall found that, whilst it was easy to remove the bulk of the purins from a solution containing albuminous substances, a certain percentage always remained which it was difficult to extract. Considering these two possibilities which have been discussed, no observation which connects gout and interstitial nephritis is inconsistent with the renal lesion being the result rather than the cause of the disease. It is not impossible that both suggestions may be true. The abnormality in the relations of uric acid and the kidney may be due in some cases to the kidney and in others to the uric acid. Ebstein has long divided his cases into "joint-gout" and "kidney-gout."

V. THE PRIMARY CAUSE OF ACUTE GOUT.

Two main theories have been advanced in recent years for the first cause of gouty symptoms :—

1. *The Presence of Uric Acid in the Blood.*—Those who hold this view may be divided into two schools, according as the uric acid is held to exercise a toxic action whilst in solution in the blood, or a passive and mechanical action after deposition.

(a). Uric acid regarded as toxic whilst in solution.—Against this view it may be urged, firstly, that uric acid, on subcutaneous injection, does not cause any toxic symptoms ; secondly, that the proportion of uric acid in the blood reaches its maximum before the gouty paroxysm at a time when no symptoms are present ; and thirdly, that uric acid circulates in the blood in large quantities in certain conditions which show no connection with gout, e.g., in leucocythæmia. This view is not generally held.

(b). Uric acid compounds regarded as acting passively and mechanically after deposition in the crystalline state.—Upholders of this view, amongst whom are Sir Alfred Garrod and Sir William Roberts, consider that each paroxysm is associated with a deposition of sodium biurate, and that inflammatory changes in the cartilages are due to subsequent mechanical irritation. Sir William Roberts believes that irregular gout is due to such deposits occurring in unusual positions. Crystals have been found on the cerebral meninges, in the neurilemma of nerves, and in the viscera. In such positions, where

the blood-flow is free, the crystals might be dissolved when the attack had passed off. This occurrence, and the ease with which small deposits in the viscera can be overlooked, may explain the limited number of the occasions on which they have been found. The arguments advanced against the toxic nature of uric acid also support this view, which has most adherents.

2. *Necrosis occurring in the Tissues.*—Ebstein considers that a disturbance occurs in the nutrition of certain fibrous tissue which leads to its necrosis, and that biurates are subsequently deposited in these necrotic areas. The cause of this necrosis he ascribes to neutral urates circulating in the blood. The necrotizing process sets free an acid which converts the neutral urates into biurates, which then crystallize. Ebstein gives no explanation or proof of the presence of neutral urates in the blood, or the production of the necrotic acid. Against this view is the fact that neutral urates are very unstable, and cannot exist even in the presence of carbonates, and therefore cannot exist in the blood. In leucocythæmia no necrosis of cartilage occurs, even though large quantities of urates are circulating in the blood for long periods. Cornil and Ranvier, Garrod, and other observers have shown that sections of cartilages containing urates frequently exhibit no necrosis at the site of the deposits. Von Noorden has suggested that the primary cause of the necrosis is a special ferment circulating in the blood, and that the urates are produced locally from the tissues by the action of this ferment. This ascribes the excess of urates in the blood to over-production, the objections to which possibility have been given above.

VI. THE CIRCULATION AND DEPOSITION OF THE URATES.

Sir William Roberts' views may be summarized as follows: There are three classes of urates, namely, neutral urates, biurates, and quadriurates. Regarding uric acid as a divalent acid, and writing it as H_2U , the sodium urates will be represented by the symbols Na_2U , $NaHU$ and $NaHU$. H_2U , the quadriurates being one molecule of biurate combined with one molecule of uric acid. The neutral urates are unstable salts which are decomposed by carbonates, and therefore cannot exist in the blood or take any part in the physiology and pathology of gout. When uric acid is dissolved by blood serum it is converted into the comparatively soluble sodium quadriurate. The sodium carbonate of the blood slowly converts this into the more stable biurate, the solubility of which is, however, only one-twentieth of that of the quadriurate. The biurate thus produced is at first a comparatively soluble hydrated gelatinous form which, with time and increasing accumulation, changes into the almost insoluble anhydrous form. Crystallization of biurate occurs when the blood by this change is converted from an unsaturated solution of quadriurate into a supersaturated solution of biurate. In leucocythæmia and certain other conditions there is also an excess of quadriurates in the blood, but in these cases a compensatory increase in excretion by the kidneys occurs, and the salt does not exist in circulation sufficiently long for the changes

necessary before precipitation is possible. The quadriurate is thus regarded as an unstable but soluble and easily excreted compound, whereas the biurates are stable but almost insoluble, and only excreted with difficulty.

The existence of these quadriurates has been subject to much adverse criticism, and experiments have proved that their existence should no longer be accepted.

Tunncliffe and Rosenheim's suggestion that urinary deposits are mixtures of biurates and uric acid is contrary, however, to the fact that certain colouring matters which normally react to free uric acid do not reveal its presence in these precipitates.

It will be noticed that if Roberts' salt be considered as $\text{Na HU} \cdot m \text{H}_2\text{O}$ instead of $\text{Na HU} \cdot \text{H}_2\text{O}$, his hypothesis remains unaltered, whilst much of the criticism urged against it is nullified. The possibility of such a substance is shown by the existence of the compound $\text{Li HU} \cdot 4 \text{H}_2\text{O}$. Roberts' theory, or such a modification, is not inconsistent with Von Noorden's views, if these intermediate salts be regarded as within the tabernacle of organic combinations from which the kidneys can split off and excrete the uric acid.

The deposition of biurates occurs in two distinct clinical conditions: firstly, in gout, in which sudden deposition is associated with an acute paroxysm; and secondly, in interstitial nephritis, in which deposition is slow, and not associated with acute inflammation. These clinical conditions correspond to certain phenomena of crystallization. A supersaturated solution may rapidly and completely separate its excess of dissolved substance on the sudden introduction of a new factor favouring deposition, such as stirring, a condition of equilibrium being thus immediately established. On the other hand, from a supersaturated solution kept at rest, crystals separate slowly, and the return to equilibrium is a prolonged process.

Further, a supersaturated solution can exist in two conditions. For a certain range below the saturation point it is in "metastable" condition, in which spontaneous crystallization cannot occur, even with the aid of stirring or shaking. Below this range, the solution is in a "labile" condition, in which spontaneous crystallization is possible. The passage from one condition to the other is due to a minute increase in concentration, and may be effected by a small change of temperature, or by an access (in the case of sodium biurates) of sodium ions. Under conditions favouring depositions, the passage is revealed by a sudden cloud of crystals. Thus a supersaturated solution may deposit its excess slowly or suddenly in different circumstances, and the fact that biurates are found in the tissues in interstitial nephritis does not prove the incorrectness of the view that a paroxysm of gout is associated with the sudden crystallization of these salts.

Much importance has been ascribed at times to the alkalinity of the blood. Haig considers that diminished alkalinity favours the deposition of sodium biurates. Experiments have shown that in gout the alkalinity is not necessarily diminished, that diminished alkalinity does not

favour deposition of biurate, and that the solubility of sodium biurate is not increased by increased alkalinity of the blood. Alkalinity in all these cases is judged by reaction to litmus, which is a very rough test. The use of phenolphthalein and Fränkel's electro-potential measurements have shown that blood is normally alkaline in only a minority of cases.

VII. FACTORS INFLUENCING THE SELECTION OF CERTAIN TISSUES AND SITES.

The deposits of urates occur almost exclusively in fibrous tissue structures, particularly in and about certain joints. Sir William Roberts has shown by laboratory experiments that the proportion of sodium salts present in the medium is an important factor in the deposit of biurates, and by analysis has found that, in the body, the highest percentage of sodium salts occurs in cartilage synovia and fibrous tissue, and the lowest in muscle, spleen, and liver. A low temperature also favours deposition. The interior of joints of the extremities, with the sluggish circulation, are at a lower temperature than more central and active localities. It is well known that a slight injury to the joint of a gouty individual may cause an acute attack. The frequency with which the metatarso-phalangeal joint of the great toe is attacked is not surprising in face of Dr. Garrod's observation that this joint showed signs of ulceration in 80 per cent of cases examined over thirty years of age, who were known not to have had gout.

GRANULOSIS RUBRA NASI.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Hallopeau¹ describes four cases of this condition, and notes two important facts : (1) That it is essentially a hereditary disease ; (2) That it is accompanied frequently by a local asphyxia of the extremities. It is an affection which occurs between infancy and adolescence, and not later than the sixteenth year. In addition to the redness the following points are worthy of note : (a) Hyperidrosis is an essential accompaniment ; (b) The ear may be simultaneously affected ; (c) The hyperæmia is pronounced round the glands, which are profoundly affected ; (d) The canaliculæ are covered by four or five layers of epithelium, and the lumen is enlarged to four or five times the normal. Malherbe's treatment by **Linear Scarification** is, in his opinion, most successful.

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HÆMATAZOA.

J. W. W. Stephens, M.D.

Hæmogregarina balfouri.—This hæmogregarine was found by A. Balfour¹ in the red cells of the jerboa or desert rat (*Jaculus gordonii*). Three forms were seen : (1) A sausage-shaped parasite or trophozoite occupying the greater part of the red cell, so that but little of the latter is left. They measure 5-6-7 μ by 1.4 to 2.8 μ . The large oval nucleus

occupies the middle third of the parasite. (2) The motile vermicule, three times the length of a red cell: they are rarely seen. (3) In the liver, cytocyts containing merozoits in various stages of development.

Hæmameba vassali.—Vassal² describes a new parasite in the red blood-cells of a squirrel (*Sciurus griseimanus*) in Indo-China. The asexual forms resemble closely young forms of malignant tertian parasites.

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HÆMOGLOBINURIA (Paroxysmal). Prof. J. Rose Bradford, D.Sc., M.D.

In paroxysmal hæmoglobinuria, attacks occur from time to time, especially on exposure to cold, during which the patient passes a large quantity of blood pigment in the form of hæmoglobin and methæmoglobin in the urine. The brown colour of the urine is dependent mainly on the methæmoglobin. No unaltered blood corpuscles are present in the urine, thus sharply marking off hæmoglobinuria from ordinary hæmaturia; but casts and the stromata of red blood corpuscles may be found in some abundance, together with peculiar yellowish globules and crystals of oxalate of lime. In severe and repeated attacks a considerable degree of anæmia may develop, and the patient may assume an icteric tint, especially marked in the conjunctivæ. The pathology of this disease was obscure till 1904, when Eason¹ showed that a pathological substance was present in the blood serum of individuals affected with paroxysmal hæmoglobinuria. This substance was shown to have a hæmolytic action, not only on the corpuscles of the affected individual, but also on those of normal individuals. This proved that the disintegration of the blood corpuscles, which is the essential phenomenon of the disease, was dependent, not on any abnormality of the corpuscles, but on the presence of a toxic substance in the plasma. Eason further showed that this toxic substance could be obtained from the blister fluid of patients suffering from the disease. During the hæmolysis there is also a very considerable increase in the phagocytic action of the white cells. The hæmolysis of paroxysmal hæmoglobinuria is very similar to that produced by an immune serum, and like the latter, two substances are necessary in order to bring it about, the so-called intermediary body and the complement. Eason further determined that the serum of normal individuals does not cause hæmolysis.

Eason, in a further paper², has extended his observations, and has shown that the intermediary body that causes the hæmolysis does not enter into union with the red corpuscles except at a low temperature. This fact had also been noticed independently by Donath and Landsteiner, and these observations show that there are two stages in the action of the hæmolysin present in paroxysmal hæmoglobinuria. Under the influence of cold the intermediary body or toxic substance present in the blood becomes anchored or fixed to the red corpuscles,

but hæmolysis does not occur so long as the blood is kept at a low temperature; in other words the complement is unable to act at this temperature. If, however, the blood be exposed to the temperature of the body subsequently to having been exposed to cold, the complement is enabled to act, and hæmolysis at once occurs. These observations afford a very satisfactory explanation of the remarkable series of events in an attack of paroxysmal hæmoglobinuria. According to Eason the toxin or intermediary body is present in the blood of these patients both during the attacks and in the intervals. As a result of exposure to cold it becomes anchored to the red blood corpuscles, and subsequently, when the temperature of the body rises, the complement present in the blood plasma is enabled at the higher temperature to bring about the hæmolysis. The hæmoglobinuria may result from exposure of only a portion of the body to the action of cold, since the anchoring process may take place in this exposed part, and the corpuscles, on being carried to a deeper and warmer part of the body, may then undergo hæmolysis. Cold and fatigue may excite paroxysms in the affected individuals, and the action of the cold may be explained as stated above. It is possible that fatigue may really act also by producing cold, as many of these patients suffer from a feeling of cold after fatigue, and hæmoglobinuria is known to occur in horses as a result of fatigue.

Although malaria and syphilis may perhaps be included as possible sources for the production of the hæmolysin, hæmoglobinuria may undoubtedly occur in patients who have not suffered from either of these diseases.

Hæmoglobinuria has been known to follow a traumatic effusion of blood, and it is possible that in such instances the effusion has led to the formation of an intermediary or anti-body which acts on the effused blood, and also on the red blood corpuscles of the circulating blood, but in most cases of paroxysmal hæmoglobinuria no history of trauma can be obtained.

During an attack, the excretion of nitrogenous extractives in the urine is considerably diminished, but this may be dependent on the simultaneous excretion of large quantities of hæmoglobin and albumin leading to diminished nitrogenous metabolism; and lastly the normal urinary pigments are much reduced in amount during the paroxysm, and may, according to Eason, be entirely absent.

REFERENCES.—¹*Edin. Med. Jour.* 1906, vol. xix. p. 43; ²*Jour. Path.* vol. xi. No. 2.

HÆMORRHOIDS.

P. Lockhart Mummery, F.R.C.S.

Sutherland¹ gives the following astringent ointment in cases of piles:—

R	Adrenalin	0·03 gram	Oil of geranium	3 drops
	Liquid paraffin	3 grams	Lanolin	15 grams
	White vaselin	12 grams		

At St. Mark's Hospital for Diseases of the Rectum, all ointments prescribed for introduction into the rectum are dispensed in collapsible

lead tubes, to which can be attached a short bone nozzle with lateral openings. This has been found much better than the old-fashioned ointment introducer.

Indications for Operation in cases of Internal Hæmorrhoids.—It is very doubtful if, in any case of well-marked internal hæmorrhoids, a cure can be effected by any form of treatment short of removal of the piles by operation. Palliative treatment, if properly and thoroughly carried out, will, however, in a certain proportion of uncomplicated cases, be sufficient to allay the symptoms and render the patient comfortable.

Operation is always indicated: (1) When there are repeated hæmorrhages, and especially if the patient is anæmic from loss of blood; (2) When the piles prolapse and have to be replaced after defæcation; (3) When prolapse occurs apart from defæcation; (4) When the patient is going to reside in a hot climate; (5) When the prolapse of the piles is accompanied by pain; (6) When the patient is unduly worried with regard to his piles.

Operation is contra-indicated: (1) In advanced age; (2) During the later stages of pregnancy; (3) When there is well-marked cirrhosis or other obstructive disease of the liver; (4) when the piles have resulted from the pressure of an abdominal tumour upon the pelvic veins; (5) When the patient is suffering from some severe constitutional malady, such as diabetes or advanced Bright's disease.

Pilcher² describes a **Modified Excision** method of operating upon piles. The method differs only in detail from the operations of Laplace, McBurney and Earle. It consists in carefully dissecting up the pile with a knife, until only a narrow pedicle containing the vessels is left. This pedicle is next clamped, and the remains of the pile are cut off. A ligature on a curved needle is passed through the base of the pedicle below the clamp, so that when it is tied up it will control the vessels of the pile. Chromicized catgut is used for the ligature, and, after tying the first stitch, a running suture is inserted around the blades of the clamp. The clamp is next removed and the suture tightened up and tied off. Each pile in turn is similarly treated. It will be seen that, by this method of operating, each pile is excised separately and the resulting wound sewn up. There are a great many different methods of performing local excision of piles, and most of them differ only very slightly in detail from the others.

Local excision, with subsequent suture of the wounds, is most suitable for those cases where there are not more than two or three well-marked piles. It is not so suitable, in my opinion, in cases where more than about three piles have to be removed. The advantages of local excision of the piles over ligature are that healing is quicker and the amount of scar tissue is reduced to a minimum. The success of all excision operations depends very largely upon whether or no aseptic healing in the wounds can be obtained. No one should perform it unless fairly confident of obtaining aseptic healing: a by no means easy matter in the case of rectal wounds.

In discussing the relative merits of the "**Ligature Operation**" and **Whitehead's Operation** for internal piles, I have pointed out³ that the complications which may follow the operation by ligature are few and invariably unimportant, and that it involves no serious risk. On the other hand, the complications which occasionally follow Whitehead's operation are often serious. It necessarily involves the division of all the nerve supply to the anal canal, and some degree of loss of sphincteric control frequently results. Severe ulceration and delayed healing are sometimes met with, and cases where a serious degree of stricture has followed Whitehead's operation have been seen by most surgeons. One of the worst features of the complications which may result is that little or nothing can be done to remedy the patient's condition. In experienced hands, the ligature operation gives uniformly good results. During the last two years I have only met with two cases of recurrence after the ligature operation at St. Mark's Hospital, out of the many hundreds of patients seen there during that time. In these cases a definite recurrence had taken place after periods of 16 and 23 years respectively from the operation. Severe pain after the operation for piles is generally due to inflammation and consequent swelling of the parts. This can be almost entirely prevented by careful cleansing of the mucous membrane before commencing the operation, and by keeping the wounds protected with sterile ointment afterwards.

REFERENCES.—¹*Pract.* July, 1906; ²*Ann. Surg.* Aug. 1906; ³*Clin. Jour.* April 4, 1906.

HEAD-NODDING OF INFANTS. (*See SPASMUS NUTANS.*)

HEART DISEASE (Congenital).

Prof. G. F. Still, M.D.

The causation of congenital heart disease is by no means clear in the majority of cases. Two groups of cases can be recognized: (1) Those due to malformation; (2) Those due to intra-uterine endocarditis. The former group Poynton¹ classifies in three sub-groups: those due to arrest of development in early foetal life, in later foetal life, and at the end of foetal life. Arrest at the early period results in such extreme deformities as the presence of only two chambers—a ventricle and an auricle—or of two auricles with only one ventricle: conditions incompatible with life. At a later period the auricles and ventricles are more or less perfect, but the large vessels are only partially developed, or are misplaced. Still later come premature closure of the ductus arteriosus or of the foramen ovale. Intra-uterine endocarditis is probably a very rare cause of congenital heart disease, but Poynton records two cases in which it was found at autopsy; in both the mother had rheumatic fever during pregnancy, and it seems probable that the foetal endocarditis was rheumatic. As a result of valvular endocarditis during intra-uterine life there is not only deformity of the valves, but secondary arrests of development in the septa, so that patent foramen ovale or ductus arteriosus may result. Cautley² states

that in his opinion syphilis is the great cause of congenital heart disease, but Poynton has rarely met with a convincing example of its occurrence.

SYMPTOMS.—Poynton states that cyanosis is the most frequent of all manifestations, and usually attracts attention at birth. Its explanation is uncertain. Some have attributed it to the mixture of venous and arterial blood, others to deficient aeration, and recently much attention has been directed to the excess of red blood corpuscles in this condition. Cyanosis is not peculiar to congenital heart disease. It is seen, for instance, sometimes in adults with a large spleen but with no morbus cordis. Occasionally it is paroxysmal in children with congenital heart disease, and associated with acute distress. Swoboda³ records such a case: An infant, aged eighteen months, who had a loud systolic murmur over the whole precordium, and was permanently cyanosed, became extremely dyspnoëic at times, with intensification of the cyanosis, and after an hour or more of acute distress, would become unconscious. These attacks occurred frequently for four months, and seemed to be anginal in character. Heubner has recorded similar attacks in an infant aged five and a half months, in whom one of the attacks ended fatally. Clubbing of the fingers, toes, and nose gradually appear with the cyanosis; the extremities are apt to be cold, and the child's temperature subnormal. Auscultation almost always shows a bruit over some part of the heart, and, as Poynton says, this may be quite soft, so as to be easily overlooked if the child is crying; but in most cases the bruit is loud. Occasionally no bruit is heard where there has been cyanosis during life, although the autopsy shows marked deformity of the heart; sometimes this has been found in cases of complete obliteration of the pulmonary artery. Crozer Griffith⁴ records a case in which, during illness, an infant five months old became cyanosed, but without bruit; autopsy showed two large openings in the auricular septum.

Poynton states that the degree of cardiac hypertrophy is usually remarkably slight with congenital heart disease. There is often marked arrest of general development, and sometimes even of cerebral capacity, as in the Mongolian imbeciles, who, as Garrod pointed out, sometimes show congenital heart disease.

It is certainly possible in some cases to recognize this disease before birth. Ballantyne has collected eight instances in which auscultation over the uterus detected the cardiac bruit of the fœtus, and J. McCrae has recorded a case in which, during pregnancy, a fœtal systolic bruit was distinctly heard, and after birth the same bruit was audible over the base of the infant's heart. The infant was much cyanosed, and died at the age of seven weeks of bronchopneumonia. Autopsy showed transposition of viscera, and the chambers of the heart were transposed; the auricular septum was widely open, and the pulmonary artery was obliterated, its work being taken by the ductus arteriosus, which was patent.

PROGNOSIS.—The majority, according to Poynton, die under two years of age. Death is sometimes quite sudden. Often it is due to

bronchitis or bronchopneumonia. Before puberty, endocarditis is apt to supervene in the deformed heart; after puberty these children are very liable to tuberculosis. Rarely, as in a case recorded by this observer, cerebral thrombosis ends the child's life. Cyanosis, he says, cannot be taken as a guide to prognosis. Cases of extreme cyanosis are often met with over eight years of age, and on the other hand infants with little or no cyanosis may die quite suddenly.

TREATMENT.—This can only be palliative. Poynton recommends that the child with congenital heart disease should be warmly clothed and protected from cold. If it can digest fat, it should be given a large quantity, as a good layer of subcutaneous fat is a great protection from cold. Of cardiac stimulants for congenital heart disease, **Strychnine** is more useful than digitalis. **Cod-liver Oil** and **Malt** are also serviceable.

REFERENCES.—¹*Brit. Med. Jour.* June 28, 1906; ²*Trans. Soc. Study Dis. Childr.* vol. v. p. 51; ³*Wien. med. Woch. in Lancet*, April 21, 1906; ⁴*Arch. Ped.* 1903, p. 367.

HEART (Surgery of).

Priestley Leech, M.D., F.R.C.S.

Fourmestraux and Liné¹, à propos of a case of suture of the heart under Picqué's care, have studied the literature of the subject, and the gist of their paper is as follows:—

The diagnosis as a rule is easy. Lemaitre's division of heart wounds into those which bleed externally and those which bleed into the pericardium is a just one. In the former there are symptoms of severe hæmorrhage, but the blood is escaping into the pleural cavity and also outside the thorax, and there is no symptom of compression of the heart. In the latter the bleeding takes place into the pericardium with greater or less rapidity. The immediate symptoms are severe: the heart, tamponnaded in an inextensible cavity, stops, and rapid death ensues. In these cases the pericardium is found distended, and the patient dies from mechanical arrest of the heart. There are of course transitions between these two clinical types, but the division is a logical one.

The authors recommend the following method of operating: A cutaneous-muscular flap is formed and thrown outwards; the flap includes the skin and the great pectoral. The advantage of turning the flap outwards is that the external surface of the thorax can be examined, and it can be seen if the wound is a penetrating one or not. The flap is covered with a compress, and the third, fourth, and fifth ribs are resected 8 cms. from the sternal border; the ribs are divided with a costotome or a strong chisel. The intercostals as a rule do not bleed, and if they do the hæmorrhage is soon stopped. The flap is turned inwards, and the parietal layer of the pleura is turned inwards with it. The only objection is that the pleural cavity is opened, but the operation can be done more quickly in this way. Very often the pleural cavity is opened by the same weapon which has wounded the heart, and the authors have never seen any severe symptoms which they could refer to opening of the pleural cavity. It is impossible to get a good view of the posterior surface of the heart unless the second

rib is divided, and the heart can then be turned inwards and upwards. It is difficult, if not impossible, to suture the heart without fixing it (see Fig. 30) between the finger and thumb. An ordinary sewing needle or Hagedorn's needle is better than Reverdin's, and the needle is not

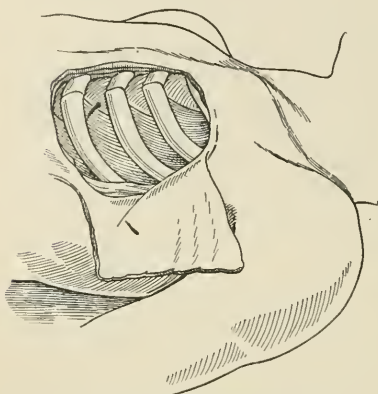


Fig. 28.—Formation of musculo-cutaneous flap.



Fig. 29.—Costal flap turned back, showing compress inserted.



Fig. 30.—Fixation and suturing of wound in heart.

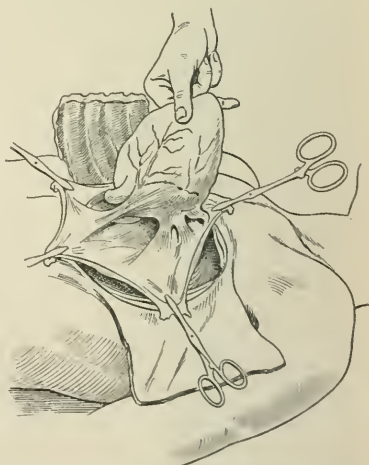


Fig. 31.—To explore the base of the heart and its great vessels, it must be turned upwards and inwards.

passed into the ventricular cavity. After the wound is sutured, the pericardial cavity is emptied of clots, etc., and is completely closed. Drainage was not used in the case referred to, and Lemaitre blamed drainage for infecting his case. The great majority of the cured cases

have not been drained, at least at first. Infection seems to be more frequently due to the operation than to the wounding agent, and therefore it is very necessary to have a perfect asepsis. If sepsis occurs, drain the pericardial and pleural cavities by separate gauze drains.

Quénu and Favariaud² each operated on a case of wound of the heart. Both were inflicted by knives; one recovered and one died from sepsis. Three fatal ones are reported.³ Thierry⁴ reports a case of wound of the heart by a revolver bullet, which was treated by intravenous injections of artificial serum, and recovered. Picqué⁵ reports a case of revolver wound in a young woman; he operated, and found a small wound of the ventricle and auricle, but they were not bleeding, and he did not sew them. The patient recovered. J. H. Gibbon⁶ reports a successful case where the right ventricle was wounded.

F. T. Travers⁷ reports an interesting but fatal case of wound of the heart in a male, nineteen years old.

Pericardium, Opening of the.—J. H. Bacon⁸ has described the procedure for opening the pericardium through the sternum. A skin incision is made, parallel to the mid-line of the sternum and $\frac{1}{2}$ cm. to its left, extending from the level of the upper border of the fifth costal cartilage to the lower border of the sixth. The sternum is laid bare over an area of 2.5 cm., and the periosteum is raised. With a trephine 2 cm. in diameter a circular window is made through the bone, as when trephining the skull; the fat is dissected away; the pericardium is raised by two mouse-toothed forceps, and an incision is made between them. From this opening into the pericardium, which is at its lowest level, the pericardial cavity can be easily explored. In children, the incision can be made nearer the middle line. After trephining it is best, where there is pus, to fill the cellular portion of the cut edge of the sternum with a 13 per cent iodoform wax. In purulent cases it is better to place a purse-string suture before incising the pericardium, leave a rubber catheter in for drainage, and pack gauze round the catheter to protect the anterior mediastinum. He thinks the pericardium ought to be opened more frequently than is done at present.

Dolcetti⁹ operated on a stab wound three-fifths of an inch long, in the right ventricle, one hour after the accident. Hæmorrhage occurred into the left pleural cavity, which was also wounded, and which was opened at the operation. When the heart was exposed it stopped beating, but after three sutures were put in, cardiac massage started the heart again. The wound was closed; but the patient, after recovering from the effects of the operation, died eight days later from infection of the mediastinum and peritonitis.

Hesse¹⁰ records a successful case of stab wound of the heart in a boy thirteen years old. Sero-purulent pleuritis with pericarditis set in, but nine months later the patient was dismissed with an opening in the left side and slight scoliosis in the spine.

REFERENCES.—¹*Gaz. d. Hôp.* Mar. 29, 1906; ²*Lancet*, April 31, 1906; ³*Sem. Méd.* July 18, 1906; ⁴*Gaz. d. Hôp.* April 17, 1906; ⁵*Bull. et Mém. Soc.*

de Chir. No. 28, 1905, quoted epit. *Brit. Med. Jour.* Feb. 10, 1906; ⁶*New York Med. Jour.* Mar. 3, 1906; ⁷*Lancet*, Sept. 15, 1906, p. 706; ⁸*Amer. Jour. Med. Sci.* Oct. 1905; ⁹*Ce tr. f Chir.* 1906, No. 20. quoted in *The. Gaz.* Aug. 15, 1906; ¹⁰*Med. Press*, Aug. 15, 1906.

HERPES.

Purves Stewart, M.D.

The causal relationship between herpes zoster and inflammatory changes of the corresponding posterior-root ganglion has been for some time well recognized. It is perhaps not so commonly realized that the herpes of febrile conditions, such as pneumonia, cerebrospinal meningitis, etc., is also referable to a similar lesion in the corresponding sensory ganglion. In the case of herpes labialis or facialis the ganglion affected is, of course, the Gasserian. Howard¹ has published some interesting pathological results in this connection. He studied the Gasserian ganglia in a number of cases of pneumonia and of cerebrospinal meningitis accompanied by facial herpes, and in every case he found that the corresponding Gasserian ganglion was infiltrated with leucocytes, the ganglion on the non-herpetic side being normal. In herpes, then, a ganglionic lesion is constantly present. The nature of the lesion varies in different cases. Thus embolism, thrombosis, hæmorrhage, invasion by tumours, micro-organisms and other toxins, may all of them produce herpes by attacking the corresponding sensory ganglion. In cases of meningitis the ganglion changes are due to extension along the nerve-roots into the ganglia.

REFERENCE.—¹*Amer. Jour. Med. Sci.* Dec. 1905.

HIP. (See DISLOCATIONS, and FRACTURES.)

HODGKIN'S DISEASE.

J. G. Emanuel, B.Sc., M.D., M.R.C.P.

Progressive Enlargement of the Lymphatic Glands is found in lymphatic leukæmia, Hodgkin's disease, glandular tuberculosis, syphilitic adenitis, lymphosarcoma, and piroplasmosis (kala-azar, dumdum fever) in the tropics, and the clinical differentiation of these cases is sometimes difficult.

Lymphatic leukæmia is at once distinguished by the characteristic blood-picture; syphilitic adenitis by the presence of other signs of syphilis, by a syphilitic history, and by the effect of specific treatment; glandular tuberculosis is best differentiated by the tuberculin test; piroplasmosis, by examination of the splenic blood and the finding of the pathognomonic Leishman-Donovan bodies.

With regard to the differentiation between Hodgkin's disease and lymphosarcoma, a chronic course (1, 2, or more years) will at once exclude lymphosarcoma, but in cases of only a few months' duration it may be impossible to distinguish except by removal of a diseased gland and its microscopic examination. On the other hand, some still hold with the view expressed by Dreschfield in 1892, that acute Hodgkin's disease is lymphosarcoma.

Moorhead¹ describes a case of lymphosarcoma occurring suddenly and spreading rapidly in a woman of fifty, who had already suffered from Hodgkin's disease for a couple of years.

Robert Muir² gives a lucid description of the anatomical and histological differences between Hodgkin's disease and lymphosarcoma, showing that Hodgkin's is a chronic infective disease quite distinct from tuberculosis, while lymphosarcoma is due to true tumour formation in lymphatic glands.

Sterling Ruffin³ gives a good account of Hodgkin's disease, with its differential diagnosis, and details an interesting case of glandular tuberculosis closely simulating Hodgkin's. He concludes by saying that the easiest and surest method of diagnosis lies in the removal and examination of a diseased gland, and that it may be impossible to make a conclusive diagnosis during life in any other way.

These two last-quoted papers are well worthy of perusal; they clearly discuss the present views on this difficult question of progressive enlargement of lymphatic glands.

REFERENCES.—¹*Med. Press*, Nov. 15, 1905; ²*Glas. Med. Jour.* Sept. 1905; ³*Amer. Jour. Med. Sci.* April, 1906.

HUMERUS. (See DISLOCATIONS, and FRACTURES.)

HYDATID DISEASE (In Australia).

G. Lane Mullins, M.A., M.D., Sydney.

In New South Wales hydatid disease is met with chiefly on the western slopes of the Great Dividing Range, or in districts supplied with water from rivers and creeks having their origin in the western slopes. The disease appears to be slightly more prevalent in females. The most fatal age-groups are: males, 5-10 years, 35-40 years; females, 45-50 years. Farmers and bush-hands are the principal occupations of those who succumb. Meteorological conditions do not appear to influence the rate of mortality from the disease.

The conditions favourable to the prevalence and spread of the disease are, according to Verco and Stirling: (1) Many dogs infected with *Tænia echinococcus*, by which means the supply of ova is kept up; (2) Many animals, such as the domestic herbivora (and in Australia the kangaroo), capable of serving as the intermediate host of the bladder-worm; (3) Conditions favourable to the entrance of the tænian ova into the alimentary canal, either of man himself or of the ordinary intermediate hosts; (4) Facility of access of dogs to the carcases or hydatid-containing organs of the intermediate hosts, such as the domestic herbivora, by which means the supply of *Tænia echinococcus* is kept up. These conditions are fulfilled in Iceland and Australia, where hydatid disease is most prevalent.

The following propositions (Verco and Stirling) indicate the principles of the treatment that are generally accepted in Australia.

1. The objections to **Aspiratory Puncture** are that it is only applicable to a small class of cases; that even in these it frequently fails in its object; that it is in itself a possible source of danger, by inducing suppurative changes, or by permitting leakage into serous cavities; and that, at best, it leaves the dead organism in place. In pulmonary hydatids there is a special risk of suffocative flooding.

2. Removal of the parasite by **Incision** is an effectual and, with proper care, a reasonably safe proceeding; it should be the recognized and general practice.

3. No other treatment is justifiable in suppurating or ruptured hydatids, if we except those in which spontaneous evacuation by the natural channels is in progress and urgent symptoms are absent.

4. **Lindemann's Operation**, in which, after removal of the parasite, the cavity of the adventitious sac is left to drain externally, has stood the test of a large experience with favourable results, and is probably the best and safest procedure for general application.

Verco and Poulton, Mills and MacCormick, Clubbe, Crago, and others, report successful cases of operation for hydatid of the brain.

Leucocytosis.—Professor D. A. Welsh and J. E. V. Barling, of Sydney, publish a very interesting paper on the results of their examination of 20 cases. The bearing of the cases on the nature and significance of the leucocytosis of hydatid disease depends on the fact that they represent a consecutive and unselected series of admissions to a large general hospital.

Eosinophilia before Operation.—Out of 20 cases examined, the eosinophilia before operation was in 2 instances excessive (over 2500 per cmm.), in 3 marked (1000–2500), in 5 moderate (500–1000), and in 2 slight (250–500). Of the remaining 8 cases, 3 showed a high normal count (over 200), 4 a normal count (100–200), and 1 a low normal count (under 100). In at least 10 cases, therefore, well developed eosinophilia (over 500) prevailed; in 5 cases the number of eosinophiles (200–500) indicated either a slight eosinophilia or a high normal count, while in the remaining 5 cases the eosinophiles did not exceed the average in health. It would thus appear that a well-developed eosinophilia (over 500) is an inconstant characteristic of the blood in echinococcus invasions, being present only in one-half of the observers' cases before operation, although three-fourths of the cases showed at least a minor increase, and only one-fourth a normal or sub-normal number. The incidence of a well-developed eosinophilia before operation would appear to be independent of the age and sex of the patient, of the temperature, and of the reputed duration of the invasion. While eosinophilia is not necessarily associated with rupture of the cyst, yet in these observations rupture has always been associated with some degree of eosinophilia. Moreover, eosinophilia appears to be independent of the nature of the cyst contents, whether these be clear or turbid fluid, or whether the cyst be single or packed with daughter-cysts. On examining the turbid fluid from the cyst in one case, most of the cells were found to be too far advanced in necrosis to be recognizable, but of the few cells whose structure was sufficiently retained for identification, all were eosinophilic leucocytes. Hydatid eosinophilia is certainly also independent of the hydatid rash.

Eosinophilia after Operation.—A marked fall in the number of eosinophiles after operation was noticed in almost all the cases. a

circumstance also noted by some previous observers. Two additional facts emerge from these results. Not only may the diminution be extreme, but it may also be exceedingly rapid. Within two hours these observers found as marked a fall as they found within twenty hours or within a few days. Again, consequent upon the post-operative fall in eosinophiles, there is frequently, if not invariably, a later post-operative rise, the secondary eosinophilia, which may exceed the initial one. Examination of the discharge revealed the presence of eosinophile cells in considerable proportion. Probably the raw surfaces left after removal of the cyst wall, and along the sinus by which the discharge escapes, not only permit more ready absorption, but also allow more extensive reaction between leucocytes and retained hydatid products.

Basophilia.—Out of 20 cases examined before operation, a marked basophilia (100–200 per cmm.) was present in 3, a slight basophilia (50–100) in 4, a high normal count (30–50) in 8, a mean normal count (20–25) in 2, and in 3 cases none could be detected. Hence some measure of basophile increase (from about 50 per cmm. upwards) prevailed in about half of the cases. There was no correspondence, however, between the degree of basophile increase and that of the eosinophile increase; all grades from zero to marked basophile being distributed impartially among the cases with well-developed eosinophilia and those without. This remarkable want of correspondence between the two reactions, however difficult it may be to explain, is not without diagnostic significance, since the association of basophilia with slight eosinophilia or marked basophilia without eosinophilia may afford an indication of hydatid invasion. After operation, the behaviour of the basophiles was equally capricious and unrelated to changes in the eosinophiles.

Neutrophile Leucocytosis.—A neutrophile increase before operation exceeding 10,000 per cmm. of blood was encountered in two instances, and in neither did any cause of the leucocytosis other than the hydatid invasion become apparent. The cyst in both cases contained clear fluid. Neutrophile leucocytosis after operation was more common.

Lymphocytosis.—An increase in number of the non-granular leucocytes exceeding 5,000 per cmm. of blood was observed in one case before, and in two cases after, operation.

REFERENCES.—Verco and Stirling (*Allbutt's System of Medicine*, vol. ii.); *Austral. Med. Gaz.* Feb. 15, 1895, June, 20, 1904, Nov. 20, 1904, Aug. 20, 1906.

HYPERIDROSIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Fischer¹ recommends that the foot or other part should be first well rubbed over with spirit containing 1 per cent salicylic acid, and then the following powder is to be well rubbed into the special fissures: R Zinc oxide 20^{gr} per cent, formalin 5 or 10 per cent, salicylic acid 10 per cent, and vasenol. It is not to be dusted on, as it irritates the eyes. Applications are to be made thrice daily. When the feet are affected,

it is dusted into the foot gear also, and any bromidrosis will have disappeared in two days, while within a week the feet should be well, except for black discoloration of the horny layers.

Leredde², writing on axillary hyperidrosis, remarks on the difficulty of keeping remedies in contact, and notes that fermentative dyspepsia is a common accompaniment. **X Rays** are the most certain method, and they act by causing atrophy of the secretory cells. Small doses are given, and repeated every fortnight or three weeks. No reddening should occur if it is done carefully and any secretion dried up after each exposure. The older methods of treatment, however, are by no means to be considered as inefficient. In practice, bathing night and morning with 1-250 **Alcoholic Solution of Corrosive Sublimate**, or 3 per cent **Resorcin**, or one of the following, is generally sufficient :—

R	Talc.	3ss	Tannoform.	3i
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Or,

R	Oxid. Salicyl.	gr. xv	Talc.	3ss
	Magnes. Carb.	3ij		

At night a paste can be applied :—

R	Pyrogallol		Lanolin.	
	Resorcin.	āā 3ss	Vaselin.	āā 3iij
	Zinc. Oxid.	3ss	Succ. Limonis	gtt. 20

This must be cleaned off in the morning by the use of olei amygdake, followed by the application of powder. If bromidrosis is present, active treatment must be resorted to, and **X Rays** are specially useful. Further, bathing with 1-500 solution of **Potash Permanganate** solution every two or three days must be added to the above. Rubber dress-protectors in women are a frequent cause of the disease, and if worn should be well covered with gauze to absorb the perspiration.

REFERENCES.—¹*Münch. med. Woch.* No. 20, 1905 ; ²*Jour. d. Prat., and Pract.* Sept. 1906.

HYPERNEPHROMA.

E. Hurry Fenwick, F.R.C.S.

In quoting a case of this variety of renal tumour, Taylor¹ considers the three classical symptoms to be hæmaturia, renal colic, and the presence of a tumour, although in his case there was no blood in the urine. Some cases are intensely malignant, with rapid recurrence, both locally and by metastases, whilst others are of little or no malignancy. The pathological appearance of the malignant and non-malignant forms is very similar. With Kelly, he advises that the blood-vessels should be cut off as soon as possible during the operation, and that the manipulation of the tumour be exceedingly gentle, so that metastases may be prevented.

As regards hæmaturia, Bell² states that hæmaturia means the onset of malignancy. Albarran found hæmaturia in 75 per cent of the cases.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Feb. 1906 ; ²*Mont. Med. Jour.* July, 1905.

ICHTHYOSIS.*Norman Walker, M.D.**Fred. Gardiner, M.D., B.Sc., F.R.C.S.*

In this condition, amelioration has so far been the highest point reached, but Jackson¹ narrates a case of cure in which the details were carried out by Stewart. The latter, concluding that both hyperpigmentation and hyperkeratosis were due to defects in the liver and intestinal tracts, decided to remove these defects by **Irrigation of the Colon**. The patient was a man of twenty-six, and every alternate night 5 gallons of water at a temperature of 120° F., and containing 1 dr. of carbonate of soda and 2 dr. of table salt to the gallon, were used as a douche. On the intermediate nights a pill containing calomel and hyoscyamus was given. The irrigation took about 4 hours to perform, and it was continued until the water came away quite clear. This was continued for four weeks, and then once weekly for another four weeks, at the end of which time the cure was established. Eighteen months later there was no recurrence.

REFERENCE.—¹*Jour. Cut. Dis.* N. Y. Dec. 1905.

INFANT FEEDING.*Prof. G. F. Still, M.D.*

Infantile mortality has been the subject of much investigation recently, and many factors have been blamed for the high death-rate which prevails in many of our cities. Johannesen¹ states that in Norway during the years 1876–1898 the average death-rate amongst legitimate children was 9·36 per cent, whereas amongst the illegitimate it was 15·03 per cent, a difference which appears to depend largely on the fact that the latter class are usually artificially fed, whereas the legitimate children are usually suckled. He quotes also the interesting statistics of Bocks at Berlin, who found that in 1895 the deaths per 1000 during each month of the first year after birth were 6·25 in those fed on mother's milk alone, 38·75 in those fed on cow's milk only, 46·1 in those fed on cow's milk and on "artificial food" (presumably a patent food), and 92·24 in those fed on "artificial food" only. Such figures emphasize strongly the paramount importance of breast feeding wherever breast feeding is possible. It is well recognized, as Sykes² points out, that suckling has become less customary in this country during recent years than formerly, a misfortune attributed partly to the increase of woman's labour, and partly to the mischievous advertisement of patent foods, which has increased greatly in the last few years.

Breast feeding.—Although it may be feared that amongst the well-to-do the ability to suckle their infants is actually diminishing, there is, according to Sykes, but little indication of this in some of the London districts, where he has estimated from his investigations that 89 per cent could be breast fed, if only the mothers could be induced to continue suckling. Too often, as Butler³ points out, the occurrence of some gastro-intestinal disturbance in the infant during the first few weeks of life is taken as an indication for weaning, when the cause of the disorder may really be quite independent of the mother's milk.

Davies⁴ found that even when the mother's milk disagrees with her infant, the quality of her milk may change after a short time, and in the meantime may agree perfectly with another infant; thus in a case where green stools, colic, screaming, and loss of weight were resulting from the mother's milk, the mother nursed a wet-nurse's baby for two weeks with entire success, while the wet-nurse suckled the marasmic infant successfully, and at the end of a fortnight the mother resumed the nursing of her own infant with perfect success. Churchill⁵ found in one case, where the infant at two months old failed to gain weight, that the breast milk contained only about 5 per cent of sugar (instead of the normal 7 per cent), the administration of a solution of milk-sugar to supply the deficiency was followed at once by rise of weight. The opposite fault, excess of sugar in the mother's milk, may also cause trouble, particularly colic, and frequent green stools. A breast milk poor in fat and proteid was found to contain, in one case 8 per cent, in another 9 per cent, of sugar. To overcome this difficulty, artificial feeding with a food poor in sugar may be substituted for some of the breast feeds, so reducing the total amount of sugar taken daily.

The composition of breast milk, however, varies at different times, in the same case, and there is a regular variation according to the age of the infant. Deval⁶ found that during the first ten days the daily average composition was casein 1·8, fat 3·3, lactose 6·6 per cent, while during the next twenty days it was casein 1·1, fat 4·0, lactose 7·1; and after this the composition remained almost constant, at casein ·95, fat 4·3, lactose 7·4 per cent.

It would seem that any one of these three constituents may, by its excess or deficiency, cause some disorder of nutrition in the infant. Tayler-Jones⁷ lays stress upon the importance of obtaining an analysis of breast milk before concluding that it is necessary to wean where the milk appears to disagree with the infant. He mentions a case in which, with a milk containing 6·4 per cent fat, 7 per cent sugar, and 1·05 per cent proteid, the infant was wasting; by limitation of milk and meat in the mother's diet, the fat in the breast milk was reduced in 10 days to 3·4 per cent, while by limiting her vigorous exercise the proteid in the milk was increased to 1·35 per cent, and with these changes the infant improved.

Where breast milk is deficient in amount, its flow may be promoted by the administration of an infusion of anise-seed, according to Burzagli⁸, who combines with this treatment the application of compresses to the breasts. For a similar purpose the powdered extract of cotton plant emulsified in milk has been used recently, and Barlerin⁹ states that this drug improves not only the quantity but the quality of the milk, considerably increasing both the fat and the proteids.

Wet-nursing.—The value of wet-nursing is generally considered as second only to that of the mother's milk, but Van Derslice¹⁰ holds that artificial feeding is now superior to what he describes as "the hit-or-miss wet-nurse," who introduces also a risk of infecting the infant

with syphilis or tubercle. There is no doubt that wet-nursing sometimes fails completely, but, as Davies¹¹ points out, the failure is often due to management. The nurse is expected to suckle the infant day and night, with no opportunity for more than an hour and a half's unbroken rest; she has little exercise, and less fresh air. Much importance is sometimes attached to similarity of age for the baby of the wet-nurse and the baby to be suckled, but Davies found that it did not matter how old the wet-nurse's infant was, provided she had plenty of milk. Handfield-Jones¹² considers that the milk of a very young woman or of an advanced multipara is less likely to agree than that of a woman between twenty and thirty years of age.

Duration of Breast-feeding.—In this country it is usually held that weaning should occur at the end of the ninth month, but Fordyce¹³, from a careful study of 29 cases in which pregnancy and lactation overlapped, found that under these circumstances the foetus was likely to suffer, and as conception rarely occurs within the first six months of lactation, and is uncommon before the eighth month, he recommends that weaning should take place early in the eighth month.

There can be no doubt that suckling is sometimes continued too long, and this is sometimes due to the belief that it prevents conception. Fordyce, however, found that in 24 per cent of suckling mothers pregnancy occurred during lactation. The return of menstruation is much more frequent; in 40 per cent menstruation occurred, and this return was more common with the early children than with the later; but in the case of the later children, menstruation reappeared in the mother at an earlier month of suckling, if it reappeared at all. The popular idea that menstruation necessitates discontinuance of suckling was shown to be erroneous. Amongst 100 such cases, in no single instance was suckling seriously affected. Indeed, Fordyce quotes Gillet as recommending for wet-nurse the woman who menstruates regularly during lactation, on the ground that this is evidence of robust health.

From a study of the effect of unduly prolonged lactation upon the subsequent children of a family, Fordyce¹⁴ found that the previous strain upon the mother had very little influence in the production of rickets in subsequent children; but his figures confirmed the received opinion that unduly prolonged suckling decidedly favours the onset of rickets in the infant thus fed.

Artificial Feeding: Modification of Cow's Milk.—In preparing milk mixtures one of the chief difficulties is to ensure a sufficiently high proportion of fat. Whipham states that for the first three or four months of life the amount of fat should be three times that of the proteids, and to obtain this advises the use of a top-milk, prepared by standing good milk fresh from the cow in a cool place for four hours, then syphoning off the upper third; begin with top-milk 2 oz., lactose 1 oz., lime-water 1 oz., diluted with water up to 20 oz.; increase the top-milk gradually until 7 oz. are used in the pint at the end of the fourth month. After the fourth month the top half of the milk

in used (assumed to contain 7 per cent of fat) in the same proportions, viz., top-milk 7 oz., lactose 1 oz., limewater 1 oz., diluted with water up to 20 oz. The top-milk to be increased gradually until, at the end of the tenth month, the infant takes 10 oz. of top-milk to the pint.

But in any such simple dilution of cow's milk, the curd-forming casein is likely to give trouble; the old-fashioned method of meeting this difficulty was by the use of barley-water as a diluent, on the assumption that this decoction mechanically interferes with the formation of large tough curds. It is clear, however, that such addition of starch to the food is quite contrary to Nature's example, and therefore some writers agree with Whipple in condemning the use of all such cereal decoctions before the seventh month; other authorities, however, would use them even for the new-born. Abundant evidence is now forthcoming of the value of **Sodium Citrate** in overcoming the curd difficulty. It is suggested that the sodium of the salt combines with the acid caseinogen to form a sodium caseinogen, instead of the tougher calcium caseinogen which is usually formed in milk curdling, whilst the calcium combines with the citric acid to form calcium citrate. Poynton¹⁵, in quoting this suggestion, states that whether it be correct or not, sodium citrate seems to have some special action in promoting the digestion of casein, an action which, according to his experiments, does not belong to potassium citrate, sodium bicarbonate, or salicylate of soda. The proportion of sodium citrate to be used is 2 gr. to the ounce of milk, and Poynton has found "tabloids" of sodium citrate less effectual than a solution of the salt. Shaw's¹⁶ experiments gave a different result. Potassium citrate was found to have about the same effect as the citrate of soda. He failed also to demonstrate any precipitation of calcium citrate such as has been described; but his clinical experience corroborated that of other observers as to its value in cases where gastric disturbance is due to proteids; and he emphasizes its value specially in cases of chronic gastric catarrh.

Fat indigestion, however, is the chief difficulty in some cases. Lowenburg describes the symptoms as vomiting within an hour after feeding, the vomit being sour, with an odour of butyric acid; diarrhoea, and sometimes constipation, greasy stools, sometimes containing curd-like lumps; and usually there is progressive loss in weight. He advises the use of milk-mixtures containing only 1 per cent of fat at first, and as the infant grows older the fat may be increased, but not beyond 4 per cent. Northrup¹⁷ describes a case in which ileocolitis in an infant aged eight weeks appeared to be due to the mother's milk, which contained 8.98 per cent fat.

The value of **Buttermilk** has been much emphasized in recent years. Stooß¹⁸ gives these directions for its preparation: A level tablespoonful (10-12 grams) of fine rice or wheaten flour is stirred in a litre of buttermilk, which is placed on the stove, and allowed to come almost to the boiling-point three times within about twenty-five minutes; two or three heaped tablespoonfuls of cane-sugar are then added. It

is then poured into flasks, holding each enough for one feed, and boiled continuously for three minutes. The chief characteristics of buttermilk are its low fat-content (·5-1 per cent) and its acidity (due to the presence of lactic acid about ·75 per cent); the proteid is only slightly lower than that present in fresh milk, and varies, according to different observers, from 2·5 to 3·5 per cent, but it is in a much more easily digestible form than in the fresh milk.

Whey has long been used in infant feeding in cases of curd indigestion, and recently Machell¹⁹ has advocated its use as a basis for infants' food; the deficiency of fat (the fat content of whey, according to Judson²⁰, is only ·33 per cent) can be supplied by adding cream. The whey proteids are of course much less than the total proteid of the whole-milk. Judson, by analysis, found the proportion to be ·85-·9 per cent, and states that according to various observers the lactalbumin of milk varies from ·3-·5 per cent, so that rather more than half the proteid of whey, which contains all the lactalbumin of the milk, may be considered as albumin; the remainder consists of another proteid, which is soluble and is derived from casein by the action of rennet. Machell points out that much care is needed in making whey; if milk or cream is to be added, the whey must be heated to 150°-155° to destroy the rennet ferment; if the whey be heated above 160° the lactalbumin may be coagulated. Whey, with the addition of a high-percentage cream (of which so little need be added that the increase of fat is obtained in the whey without incurring much increase of curd at the same time), and with addition of milk sugar, was found to give excellent results, and to effect a reduction of mortality in enterocolitis amounting to more than 75 per cent, according to Machell's estimate.

Goat's Milk has recently been much advocated for infant-feeding. Bell²¹ found the average proportion of proteid to be 3·8 per cent, while the fat was 4·8 per cent. The sugar, not estimated by this observer, is about 4·0 per cent. There seems, therefore, no *prima facie* reason for expecting this milk to suit an infant better than cow's milk; but Bell finds that the fat of goat's milk differs from that of cow's milk in containing much less stearine, in which it resembles human milk. He quotes cases in which goat's milk gave good results, but mentions the passage of much curd in the stools as one trouble, which was obviated by the addition of rice-water to the goat's milk in the proportion of 3-5.

It is pointed out that the proportion of proteid is higher in goat's milk than in human milk, and such a difference corresponds, according to Heubner, to the rapidity of growth of the animal for which the milk is provided in nature. Rabbit's milk contains 10·4 per cent proteid and 2-4 per cent ash; the newly-born rabbit doubles its weight in about seven days. The goat's milk contains 4·3 per cent proteid (Heubner) and ·8 per cent mineral matter; the kid doubles its weight in 19 days. Human milk contains 1·0 per cent proteid (Heubner) and ·2 per cent ash; the infant doubles its weight only after 180 days. Hubert²² states that goat's milk may be used raw, and gives excellent

results if the animal be properly cared for; he recommends Alpine goats, others have recommended the Nubian goat.

Preservation of Milk.—It remains a moot point whether boiling or pasteurizing milk interferes with its nutritive value. Brüning²³, experimenting with puppies, found that a better result was obtained with boiled milk than with raw. Lindman²⁴ states that pasteurizing impairs the nutritive properties of milk considerably, both for infants and for young quadrupeds. The latter writer describes a method of preservation invented by Budde, of Copenhagen. The milk is strained, warmed to 34° C., and then a small amount of hydrogen peroxide is added to it, and the vessel kept moving for a certain time until all the hydrogen peroxide has been decomposed; the milk is then cooled to 18° C., and put into stoppered and sterilized bottles until used. Milk treated thus will keep fresh for fully six weeks.

The addition of formalin to milk, and indeed of any chemical preservative, has been condemned by most medical authorities. Engel²⁵ states that formalin has a detrimental effect upon the digestive apparatus, and moreover finds that while formalin in certain strength arrests the growth of bacteria in milk for the first two days, these bacteria subsequently develop more rapidly than usual in such milk. Douglas²⁶ finds that to keep milk sweet for 48–72 hours formalin must be used in the proportion of not less than 1–30,000, and from experiments concludes that it does not retard digestion when present in a strength of 1–25,000.

Patent Foods.—Sutherland²⁷, while insisting that no food which contains starch is suitable for an infant under nine months old, thinks that under certain conditions various “foods” are useful. In cases of vomiting or diarrhœa, dried milk, or condensed milk without any addition of cream, is often useful. (See also MARASMUS.)

REFERENCES.—¹*Pediatr.* May, 1906; ²*Nat. Confer. Infant. Mortal.* 1906, p. 159; ³*Pediatr.* Mar. 1906, p. 164; ⁴*Ibid.* Dec. 1905, p. 176; ⁵*Ibid.* Mar. 1906, p. 165; ⁶*Brit. Jour. Child. Dis.* Apr. 1906, p. 173; ⁷*Arch. Ped.* July, 1906; ⁸*Pediatr.* April, 1906; ⁹*La Clin. Infant.* April, 1906; ¹⁰*Pediatr.* Mar. 1906; ¹¹*Ibid.* Dec. 1905, p. 775; ¹²*Pract.* Oct. 1905, p. 448; ¹³*Lancet*, Jan. 1906; ¹⁴*Brit. Med. Jour.* April 28, 1906; ¹⁵*Med. Press*, Oct. 1905; ¹⁶*Arch. Ped.* Mar. 1906; ¹⁷*Ibid.* 1905, p. 905; ¹⁸*Brit. Med. Jour.* Append. Feb. 1906; ¹⁹*Canad. Jour. Med. and Surg.* Sept. 1905; ²⁰*Arch. Ped.* July, 1906, p. 504; ²¹*Ibid.* Mar. 1906, p. 194; ²²*Lancet*, Aug. 25, 1906; ²³*Pediatr.* Mar. 1906, p. 197; ²⁴*Nord. Méd. Arkiv*, 1905, in *Pediatr.* Aug. 19 6, p 523; ²⁵*Zeits. f. Aezztlich. Fortbr.* 1905, No. 1; ²⁶*Scot. Med. and Surg. Jour.* Nov. 1905, p. 398; ²⁷*Clin. Jour.* Nov. 22, 1905.

INFLAMMATIONS.

Priestley Leech, M.D., F.R.C.S.

Bier's Treatment by Passive Congestion.—Bier's method of treating tuberculous arthritis by means of **Passive Hyperæmia** has been known for a long time to surgeons, but has not been very much used. Recently this method has been extended to the treatment of other conditions, especially acute inflammations and suppurations.

Cathcart¹ thought that this method would before long be recognized as a standard treatment. Bier looked upon inflammation

as a curative agent, and by a piece of elastic bandage properly applied, the surgeon was able to do nearly, if not quite as much, to cure established septic inflammation of the extremities, as antiseptic methods had done to prevent them. The bandage is always applied at a considerable distance above the seat of the injury: e.g., in a whitlow it is applied round the upper arm; in an injury to a foot, round the thigh. The bandage is put on sufficiently tightly to interfere with the venous return, but not so as to more than diminish the arterial flow; in acute cases the pressure is very light. The pulse below the bandage should be easily felt, and the limb should be warm. The relief of pain is a great test of the degree of tightness. After a few minutes the whole limb begins to swell, and the fiery red colour, formerly limited to the hand and wrist, extends up to the bandage. When this oedema is well established, serum escapes freely from any wound which may be present. There must be nothing tight below the bandage. Severe cases should be treated in bed. The passive congestion in bad cases should be kept up for twenty-two out of the twenty-four hours, and this might be diminished by degrees to from eight to ten hours. The position of the bandage should be changed after it has been ten hours in one place. In parts of the body (e.g. the shoulder) where there is no room to change the bandage, Bier recommends that the congestion should not be kept up longer than eight or ten hours. In the intervals of relaxation, the limb should be raised, to favour absorption. As a general rule, the patient is soon eased of pain and feels better, the pulse improves, and the temperature falls. This fall occurs very quickly when the cause is due merely to absorption of poison from the inflamed area. As this improves by the use of the bandage, it responds less and less to constriction of the limb, until the reaction is almost as little as it would be in health. Pus must be let out, but incisions need not be extensive. If blisters appear, the bandage has either been too tight, or suppuration has occurred and must be relieved. Great care must be exercised the first two days.

In the treatment of *tuberculous* cases, congestion must only be kept up for one or two hours daily; and in these cases cyanosis but no oedema resulted, while in acute inflammation, congestion is prolonged for the greater part of twenty-four hours. In whitlows and suppuration of tendon sheaths, Bier finds that numerous small incisions give all the outlet required, with a minimum of injury to important parts and subsequent development of scar tissue. An unopened joint containing pus is punctured with a fine needle, merely for diagnostic purposes, but is neither opened nor drained, and gentle passive movements are commenced as soon as the anæsthetic effects of the passive congestion permit, generally after a few hours. Out of 22 cases of suppurative inflammation of tendon sheaths treated by this method, 14 recovered with sound tendons. Of 14 cases of suppurative osteomyelitis treated by Bier, 6 healed without necrosis, 5 with very little necrosis, 2 had extensive necrosis, and 1 died of pyæmia.

Bier has applied his bandage to the head and neck in cases of acute inflammation of the ear. Danielsen² speaks well of the treatment, and for a *furuncle* the congestion is produced by means of a dry cup provided with a rubber bulb; the patient's feelings provide a useful guide to the degree of congestion needed. The cup is allowed to remain in place three-quarters of an hour, and in some cases it is advantageous to reduce the suction momentarily every two or three minutes. This treatment is repeated every twenty-four hours; if suppuration has begun, puncture the abscess under ethyl chloride anaesthesia, and apply the cup as before.

Colley³ also speaks well of the method in *puerperal mastitis*, *buboes*, and *boils*, but says severe diabetes is a contra-indication, and he does not recommend the application of the bandage to the head, owing to the intracranial hyperaemia that must be produced.

Breuer⁴ gives the results of several cases of joint tuberculosis treated by Bier's method.

Bonheim⁵ read a paper before the Hamburg Medical Society on the treatment of *acute inflammation* by Bier's method. He says the treatment can be carried out in the out-patient department. He has never seen any injury produced by the bandaging. Collections of pus need not be drained, and may be opened with small punctured wounds. He has had good results in mastitis, periosteal phlegmons, subcutaneous abscesses, and lymphangitis. In three cases of gonorrhœal arthritis the treatment had no influence over the pain, and partly failed in suppurative arthritis.

Rubritius⁶ says the technique is not easy, and he has seen sepsis in a complicated fracture, and general septic infection follow the treatment in 2 cases of suppurative arthritis. Generally, however, the treatment gives good results in suppurative processes.

Von Brunn⁷ reports the results of the treatment in the Tübingen Klinik, and on the whole these were very favourable. Erysipelas occurred in 6 cases, apparently in consequence of the treatment. He thinks it a very useful treatment for acute inflammations, especially in the early stages and in bad progressive cases, but it needs careful watching.

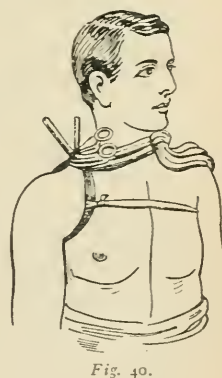
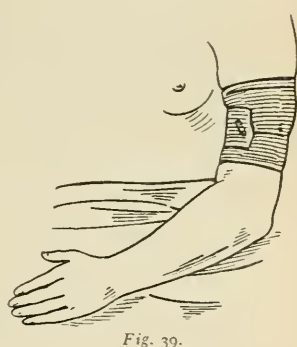
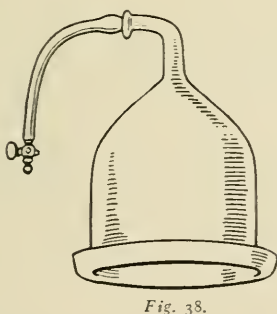
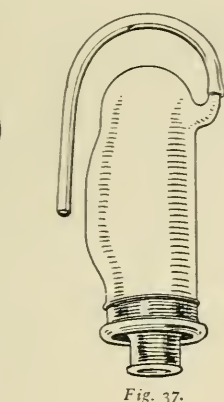
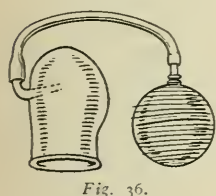
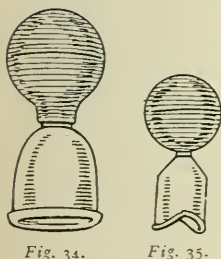
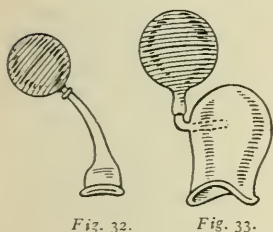
Suppurating wounds have also been treated by hyperaemia by means of cupping-glasses.

Ullman⁸ reports 3 cases of *tuberculosis of the testicle* treated by the same means, with great improvement.

Deutschländer⁹ recommends that it be employed in the treatment of *fractures*. He says it hastens the formation of callus, lessens the pain, and shortens the time of treatment, with earlier movement of the limb. The bandage remains on six to eight hours daily, with removal for a short time at the end of three to four hours. He has also employed it after osteotomy of the femur and of the tibia, in order to hasten the union of the bones.

G. Fichera¹⁰ made some experiments on guinea-pigs and dogs in order to elucidate the mechanism of Bier's treatment in acute

infections. The conclusions he comes to are: The hyperæmia of stasis accompanied by œdema, even if slight, determines a slowing of the circulation in the part, which, while rendering less easy the general invasion of the organism by bacteria, prepares at the same time an unfavourable environment for the bacteria, especially by the action of the migrated white cells, which prepare *in situ* a truly active phagocytic power. This power reminds us of the defensive power which the lymphatic glands exercise in retaining attenuating and destroying germs, even if very virulent. If applied late in the infection, success



Various forms of apparatus for inducing localized hyperæmia. Figs. 32-38 for suction hyperæmia Figs. 39 and 40 for constriction hyperæmia.

cannot be looked for, because, in spite of this phagocytic bactericidal action, the noxious action of the products already elaborated by the germs and accumulated *in situ* cannot be neutralized, and these poisonous products are often very damaging to the leucocytes themselves, which ought to develop the phagocytic activity.

Bier methods for inducing a local hyperæmia have been also used to prevent infection in incised and perforating wounds of the

extremities. It cleanses the wound, and, so to speak, produces a local immunization and a reaction before the infection has a chance to become active. It is also useful in contusions in helping to disperse the blood, for example in the ordinary black eye. (The illustrations *Figs. 32-40* give an idea of the various forms of suction and constriction apparatus used, and a long bibliography is appended to the paper).

Octave Dauwe¹¹, of Ghent, in a review of the therapeutics of hyperæmia, either in a hot-air chamber or by the active and passive hyperæmia of Bier, says that, with few exceptions, the congestive method of Bier is excellent and will continue to extend: it will cure rapidly and efficiently a number of acute and chronic inflammations, especially those of the joints. It should not be used in grave generalized affections, such as septicæmia, diabetes, or degeneration of the internal organs, or where there is disease of the vessels, arteriosclerosis, and varices. Large and early incisions should be made into old and extensive purulent collections, instead of simple punctures; and in tuberculous lesions, with abundant fungosities and extensive necrosis, resection is to be preferred.

REFERENCES.—¹*Lancet*, Feb. 17, 1906; ²*Münch. med. Woch.* Nov. 28, 1905; ³*Ibid.* Feb. 6, 1906; ⁴*Med. Rec.* Feb. 24, 1906, p. 290; ⁵*Münch. med. Woch.* p. 894, No. 18, 1906; ⁶*Ibid.* May 1, 1906; ⁷*Berl. klin. Woch.* Jan. 1, 1906, abstracted from *Beitr. z. klin. Chir.* Bd. 46, Hft. 3; ⁸quoted in *Lancet*, Dec. 9, 1905; ⁹*Münch. med. Woch.* April 10, 1906, see also *Ibid.* p. 633, No. 14, April, 1906, articles by Prof. Erich Lexer, and Bestelmeyer ¹⁰*Il Policl.* p. 912, Anno xiii. Fasc. 28; ¹¹*Gaz. d. Hôp.* July 21, 1906.

INSANITY. (See also ALCOHOLISM, BRAIN TUMOURS, DEMENTIA PRÆCOX, GENERAL PARALYSIS, etc.) C. C. Easterbrook, M.D.

CLINICAL OBSERVATIONS ON

THE BLOOD AND CEREBROSPINAL FLUID OF THE INSANE.

THE BLOOD.—Dide¹ opened a discussion at the Lille Congress on the blood in the insane. The changes observed by various workers embrace, according to Dide, chiefly the following:—*Specific gravity*—an increase in the stuporose phase of dementia præcox. *Alkalinity*—a decrease during mental excitement in the psychoses generally, in epilepsy during the fits, and in mental confusion, dementia præcox, pellagra, and general paralysis. *Urea and potassium salts*—a distinct increase in epilepsy just before the fits.

The Red Cells or Erythrocytes, and Hæmoglobin.—Variations may occur in size, e.g., macrocytes in myxœdema, and in shape, e.g., poikilocytes, and staining power, e.g. polychromatophils, in dementia præcox, general paresis, and tabes; and in the two latter, nucleated erythrocytes (normoblasts) have also been observed. An increase of red cells has been observed in maniacal states and in euphoric general paralysis, that is, in excited states, in which the excretions are often increased. A decrease of red cells with a fall in the hæmoglobin value has been noted in acute delirium and catatonic states. In epilepsy

it is stated that the hæmoglobin value is low, and is lowest during the fits, at which time the erythrocytes are said to be most numerous. The resistance of the red cells, or "globular resistance" of Dide, is said to be decreased during the fits in epilepsy, and in dementia præcox to be decreased during stupor and increased during excitement; and Dide says that a fall in the globular resistance often coincides with a lowering of the alkalinity.

The White Cells or Leucocytes of the blood have received considerable attention, and the changes reported as occurring in them in the insane have been grouped by Dide as follows:—In *dementia præcox*, leucocytosis is present; in the early stage with anxiety and negativism, a polynucleosis, with often a crisis of eosinophilia; in the catatonic stage, an appreciable mononucleosis, with polynuclears moderate in number; and in the phase of excitement with stereotypy and verbalization, a marked mononucleosis, with polynuclears diminished in number. In *general paralysis*, leucocytosis is negligible, except during febrile attacks and congestive seizures, and in the terminal stages, at which times there are bouts of polynucleosis with crises of eosinophilia, and a tendency to a progressive decrease of the polynuclears as time goes on, similar to that observed in *dementia præcox*, but less marked. In *manic-depressive insanity* the observations are conflicting, but the polynuclears are said to be slightly increased during the excited periods and to be normal in number or slightly decreased during the depressed periods. In *epilepsy* the polynuclears fall and the eosinophils rise immediately before the fit, and the polynuclears rise immediately after the fit, giving rise to a temporary leucocytosis.

Dide at this stage concludes that:—(1) A decrease in red cells, with a fall in the hæmoglobin value, is symptomatic of an intoxication or an infection; (2) An increase of red cells means a state of "molecular concentration" of the blood; (3) Polynucleosis occurs at the beginning of toxi-infective psychoses, and in states of excitement; (4) The progressive disappearance of polynucleosis and appearance of mononucleosis, and consequent inversion of the ordinary leucocytic formula of the blood, is a rare event in pathology, and probably means the failure of the organism under prolonged toxi-infection; (5) Eosinophilia in psychiatry is the index of "critical phenomena;" (6) The cyclic changes of the red and white cells in epilepsy point to auto-intoxication in this disease.

Microbes.—Various cocci and bacilli have been obtained from the blood of the insane, and some twelve species are mentioned, including the tubercle bacillus, Shiga's dysentery bacillus, the typhoid bacillus, Dide's long saprophytic bacillus, and others. Dide states that none of these are specific of insanity. At the same time their presence in the blood is abnormal, and he considers that, though circulating in the blood as saprophytes, they may secrete nerve poisons, and so be functionally pathogenic. He does not allude to the findings of the Ford Robertson school in general paralysis and tabes.

Serum.—Dide refers to the complex study of the physical and

biological chemistry of the serum, and to observations on the abeyance of epileptic fits during mild fevers, and on the lasting improvements or even recoveries which may set in during convalescence from fevers. He states that the "function of defence" against bacteria is disturbed in the confusional psychoses, dementia præcox, and general paralysis, but that the disturbance in most cases is indefinite in character.

Dide then argues the case for the toxæmic hypothesis of the psychoses and neuroses. He says: (1) Morbid heredity or predisposition cannot be doubted, but is insufficient to bring about insanity or epilepsy; (2) Another factor is necessary: *toxæmia*; (3) The toxic origin of hallucination in the acute psychoses is incontestable; (4) The proof is, so to speak, experimentally furnished by alcoholic insanity, and the same holds good for the insanities of infective diseases. He finally concludes that:—(1) The acute intoxication and infection psychoses are a direct attack on the psychical neurons of the cortex cerebri by poisons circulating in the blood; (2) The sub-acute toxi-infective psychoses are a more or less diffuse attack by complex poisons (meta-toxi-infections), giving rise to variable symptoms; (3) The chronic toxi-infective psychoses, such as dementia præcox and general paralysis, resemble the preceding in being a diffuse attack by complex poisons giving rise to variable symptoms, but in addition there is an attack on the tissues of the host (para-toxi-infections) giving rise to the characteristic progressive physical signs of these diseases; (4) Epilepsy is a cyclical toxæmia; (5) The involution psychoses are toxæmias of the senile brain arising from hepatic, and especially thyroid, insufficiencies.

In the discussion on Dide's paper, which is important in view of current toxæmic theories of insanity, and as coming from one of the strongholds thereof, Maurice Faure said that he had between 1898 and 1901, along with Laignes Lavastine and Rosenthal, examined for bacteria the living blood of 46 delirious persons suffering from various acute diseases, and had only once obtained a positive result—Eberth's bacillus in a case of typhoid. His and his colleagues' findings did not support the observations reported by Dide.

Sabrazès said that E. Régis, Laurés, and himself had examined the blood (coagulability, red cells, hæmoglobin, and white cells) in 9 cases of insanity, mainly mental confusion and dementia præcox, and had been struck chiefly by the conflicting character of the results, and the relative integrity of the blood as compared with the severity of the nervous disorder. Sabrazès emphasized the importance, in making blood examinations in the insane, of recognizing the influence of concomitant disturbing factors capable of modifying the characters of the blood, such as the presence of tubercle, dyspepsia, and diseases of the heart, kidneys, and skin; also the presence of such factors as medicinal agents, physical agencies (heat, cold, water, e.g. baths), open-air or indoor life, rest or exercise, fasting or digestion, milk food or mixed diet, and vasomotor disturbances arising in emotional and hallucinatory states. It was necessary to take account of all these in

making blood examinations, and in interpreting the observations and results; and every blood examination should be interpreted individually with regard to the detailed clinical examination "*sous les yeux*."

Régis supplemented Sabrazès' remarks by stating that the proof of the toxic origin of insanity lay in the examination, not only of the blood but also of the urine, stools, etc., and, indeed, by means of all the clinical methods of analysis at our disposal. He had noticed an interesting relation in the acute toxic insanities between the curve of the psychosis and the curve of the urinary volume, the urine being small in quantity at the onset of the psychosis, sinking to its lowest at the height of the psychosis, and rising when recovery set in, even to the extent of a polyuria; and in a recent case which he and his colleagues were investigating, of acute hallucinatory confusion in an anæmic woman during lactation, at the time of greatest intensity of the psychosis, a low globular value of the blood coincided with a low volume of urine containing much urea, reduced chlorides, and some albumin; and three weeks later, a normal globular value of the blood coincided with a normal volume of urine containing less urea, more chlorides, and more albumin. Curiously, said Régis, the mammary secretion of this woman was normal.

Dide replied: (1) That the bacteriological technique employed by Faure and his colleagues had been faulty, and that it was necessary to employ *ballons* containing 250 grams of bouillon in order to obtain positive cultural results; (2) That there were undoubtedly many conflicting observations in the hæmatology of insanity, but that he thought there were sufficient observations, especially by Italian workers, on which to base certain conclusions, for example, the inversion of the leucocyte formula; and (3) That he possessed parallel records of the urine and blood in the insane, but considered that the urine picture was beyond the scope of his communication.

L. C. Bruce² states that acute mania (maniacal excitement with confusion), excited melancholia, *folie circulaire* or manic-depressive insanity in both excited and depressed phases, hebephrenia, catatonia in both early hallucinatory and later stuporose phases, and the insanities associated with epilepsy and general paralysis (two diseases which Bruce regards as toxæmias, the insanities, especially excitement, associated with them being superadded accidental toxæmias), are bacterial infections. The data on which this generalization is based are Bruce's own observations, which are shortly as follows:—

1. In all cases there occurs in the blood a "polymorphonuclear hyperleucocytosis," the polynuclears rising above the normal maximum of 10,000 per cmm. to 30,000 or more, and the polynuclear percentage from the normal 70 per cent to 80 or 90 per cent. In acute mania the polynuclears are high at the onset of the attack, reach their maximum at its height, then fall; but if recovery occurs, rise again to a high level, which is generally maintained even after recovery; and in acute mania the eosinophils are usually low at the onset and height of

the attack, but rise and remain high, amounting to eosinophilia, if recovery occurs. In the other diseases of this group there does not seem to be any definite relationship between the polynuclear and the eosinophilic readings, the eosinophils being sometimes high and sometimes low, irrespective of the variations of the polynucleosis present.

2. Positive evidence of the presence of bacteria in the blood of patients suffering from the above-mentioned diseases was obtained in only two instances—"one, a case of acute mania in a typhoid state, gave a pure growth of a small streptococcus, and the other, a case of catatonia, also yielded a streptococcus somewhat larger."

3. Frequently agglutinins to these streptococci are present in the blood sera of such patients, these bacterial agglutinins not being present in the control serums used. Bruce obtained agglutination of cultures of the mania streptococcus with mania serum in 19 out of 23 cases, with excited melancholia serum in 3 out of 6 cases, and with general paralytic serum (which also is said to agglutinate the *Bacillus coli communis*); and he obtained agglutination of cultures of the catatonia streptococcus with catatonia serum in 6 out of 12 cases. He does not consider it necessary for the organisms of these bacterial infections to effect a lodgment in the tissues of the host in order to produce agglutinins in the blood serum, and adduces evidence in favour of the production of the agglutinins in the gastro-intestine, and apparently by digestion of the bacteria themselves.

4. In a recent paper³ Bruce states that the sera of patients suffering from the aforesaid insanities (except apparently general paralysis, which is not referred to) contain also a substance which "agglutinates" the red cells of normal blood, but not the red blood corpuscles of the affected individual himself, nor does this substance in the serum of a patient suffering from any one of these diseases "agglutinate" the red cells of another person suffering from any of the other diseases of this group. He considers that this "agglutination" reaction of the red cells of normal blood serves as a test for distinguishing the insanities into two great groups—the infective and the non-infective—but states that he has also obtained the reaction with the sera of patients suffering from chronic rheumatism, pernicious anæmia, and enterica. This "agglutinating" substance is not the same as the substances (bacterial agglutinins) which agglutinate the mania streptococcus and the catatonia streptococcus above referred to.

It may be added that Bruce has administered the anti-serums of streptococcus, staphylococcus, and *Bacillus coli communis* in various forms of acute insanity⁴. The three serums given hypodermically produced no beneficial action, and given orally were similarly unsuccessful, except in so far as they were held to have "aborted" threatened relapse and recurrence in four maniacal cases.

Rebizzi⁵ suggests an ingenious method of investigating the alleged toxic action of the blood of the insane on nerve cells, by applying leeches to the various insane persons, killing the leeches after a definite interval, and examining their nerve cells by Cajal's method.

THE CEREBROSPINAL FLUID.—N. A. Pashayan⁶ found considerable variations of *pressure* of the cerebrospinal fluid in different persons suffering from the same psychoses, the fluid escaping from the lumbar puncture needle drop by drop as normally, or in a trickle, jet, or gush. The highest, as well as the lowest, tensions were seen in epilepsy, but a high tension, though common, was not invariable in epilepsy, general paresis, dementia præcox, and manic-depressive insanity. A. Deroubaix found the tension increased in conditions of mental excitement, especially in epileptics and general paralytics. The pressure of the fluid is increased also in meningitis (e.g. tuberculous and epidemic cerebrospinal), intracranial tumours, fractures of the skull (e.g. basal), and in uræmic convulsions and coma; and it may be gauged, if necessary, by means of Eve's cerebrospinal manometer.

Albumin is increased in paresis, tabes, cerebral syphilis, and according to various observers, in epilepsy, catatonia, senile dementia, arteriosclerosis, and apoplexy. *Cholin* is increased in paresis, tabes, and in other degenerations of the nervous parenchyma.

Leucocytes.—Pashayan examined the cerebrospinal fluid in 100 mental cases: 27 general paralytics, 25 major epileptics, 13 hebephrenics, 8 catatonics, 7 paranoiacs, 7 manic-depressives, 7 chronic alcoholics, and 6 syphilitics; and obtained lymphocytosis only in the general paralytics, the returns for the 27 cases being as follows: No lymphocytes in 3 cases, 1 to 10 in 3 cases, 11 to 20 in 5 cases, and more than 20 lymphocytes in 16 cases (the highest count being 282 lymphocytes in 1 case). It is important to note the method employed by Pashayan. He examined the fluid, without centrifugation or staining, in a Thoma-Zeiss hæmocytometer, counting the number of cells in the entire field of 400 small squares in 10 chamberfuls, the number of cells in 4,000 squares being taken as the index of the lymphocytes, any fluids with red cells being discarded. In positive cases he centrifuged the remainder of the sample fluid and stained films of the sediment in the usual way, and found that the lymphocytes were mainly of the large variety (70 to 80 per cent), with occasionally a few "transitionals." Most observers have stated that the cells found in the cerebrospinal fluid of paretics are the ordinary small lymphocytes, with occasional large mononuclears. Lymphocytosis is present in tabes as well as in paresis, also in sub-acute and chronic meningitis, and in syphilis of the central nervous system, but not in ordinary syphilis without nervous lesion (although this is denied by Merzbacher). Lymphocytosis is absent in dementia præcox, confusional insanity, and epilepsy (A. Deroubaix), and in chronic alcoholism (O. Rehm).

TREATMENT.

Both the "rest" and the "exercise" methods as formerly practised in the treatment of insanity had their good and their bad points. The "Rest" treatment did good by soothing an excited, and saving the

energies of an exhausted, nervous system ; it did harm by confining the patient too much indoors, and if carried out vigorously in bed for too long a period, it led to the evils of prolonged bodily inactivity, such as sluggish metabolism of the bulky musculature, inefficient action of the skin, bowels, liver, and kidneys, and weakening of the heart and circulation, evils, however, which Weir Mitchell and others long ago showed could be obviated, in the prolonged rest treatment of neurasthenia, by such measures as massage, passive and active movements, hydrotherapy, electrotherapy, and the like.

The "**Exercise**" treatment did good by taking the patient much out of doors, and by keeping the metabolism and general bodily functions in working order, but it did harm by consuming unduly the energies of a morbidly exhausted or excited nervous system. The metabolism of the nerve centres is undoubtedly not to be treated on a par with the metabolism of the muscles and other bodily organs.

The **Sanatorium Treatment** of insanity combines the advantages of the rest and exercise systems, and may be shortly described as the "rest cure" carried on under "open-air" conditions. Many asylum physicians have undoubtedly practised this system for years, but as a rule not as a routine method, and largely at the bidding of tempting seasonal and weather conditions. The sanatorium treatment of the tuberculous insane is already the practice in every well-equipped asylum, and in some institutions in America is carried on permanently out of doors in tents day and night, summer and winter. In the treatment of active insanity, especially in its earlier and more curable stages, but also during the relapses of old-standing cases, the combination of rest in bed with the fresh air of the open is so beneficial that it may be safely predicted that the sanatorium treatment of insanity itself will also become the rule in asylums ere long.

To enable this treatment to be conveniently carried out, the mental hospital should face the south, and the reception wards should be provided with freely-accessible verandahs, having a more or less southerly to westerly exposure, with shelter from the north and east. The verandahs should be deep enough to allow the beds to be placed parallel to one another, the roof of the verandah projecting well beyond the foot of the bed, so as to serve as a sufficient protection from rain, etc. Isolation of individual patients, if necessary, can be effected by means of screens. Rest in bed in the open air is eminently suitable for all morbidly excited patients. The very fact of being in bed suggests to the patient the calm and rest, and entices the sleep, which are so desirable for him ; the inactivity of the recumbent attitude means a diminution in the flow of disturbing muscle sense impressions to the higher nerve centres and, therefore, a diminution in the outflow of motor impulses from the latter, and consequently the recumbent attitude leads to a physiological reduction of restlessness. In addition, the fresh air of the open has an undoubted soothing and soporific influence on the nervous centres, whilst the cooler outdoor atmosphere stimulates general bodily metabolism and appetite. It is not surprising to find

that maniacal patients as a rule rapidly improve under this system, and, further, that the use of hypnotics and sedatives is kept at a minimum. As a rule, in cases of mania, bed treatment in the open may be safely continued until the excitement subsides, the restlessness of the patient making it unnecessary to adopt massage or allied measures; and in prolonged cases the recumbent attitude undoubtedly saves the strength of the patient, and minimizes the risk of undue exhaustion of the nervous centres.

An initial period of bed treatment in the open is also highly suitable for morbidly depressed patients. The *rationale* of rest in such cases is, perhaps, at first sight not obvious, and, indeed, S. I. Franz and G. V. Hamilton⁷ have recently advocated exercise in melancholia, basing this practice on limited experimental investigations of the mental reaction-time of melancholiacs. They observed that these mental reactions, which are usually retarded, were quickened in the afternoons following morning exercise, also, however, in the morning following a restless or sleepless night. Nevertheless, they read the quicker reactions as meaning mental improvement, considered that melancholiacs required "keying up," and concluded that in melancholia there was a condition of lowered irritability, which it was desirable to raise to a normal level by systematic exercise. Franz, however, from later experiments⁸ admits that there is no satisfactory evidence to show that the retardation in melancholia is due to lowered irritability, and states that while systematic exercise may lessen the mental retardation and change a habit of slowness into one of quickness, it does not cure the depression. No one will say that melancholiacs are the better for restless or sleepless nights, and the conclusion that one comes to is that quicker reactions produced in melancholiacs by the "keying up" process, whether in the form of systematic exercise or a restless night, are a fictitious sign of mental improvement, being attributable to the irritability of a fatigued, weakened, or poisoned nervous system.

In the writer's experience, melancholiacs make more satisfactory progress with an initial course of rest in bed than without it, and still more satisfactory progress if the bed treatment is carried on in the fresh air. At the same time the absolute rest treatment of melancholia has its limits of duration, for the reason that in melancholia there is commonly a passivity of the musculature and body generally, and consequently an earlier tendency to the metabolic and other bodily troubles of prolonged inactivity. For this reason, if improvement does not set in within two to three weeks under the absolute rest and open-air *régime*, the patient should be allowed mild walking exercise for a short period daily, and if he is unfit for this, or the worse for it, massage, and passive or active movements in bed should be adopted, thus combining the continued necessary "rest" for the nervous system with the equally necessary "exercise" of the muscular and other bodily organs.

Similar measures of modified bodily exercise are indicated still more

in the rest and fresh-air treatment of stuporose and catatonic patients, in whom conditions of muscular passivity, restiveness, or even paresis are pronounced features. For such cases, as well as for delirious and confused patients, and the subjects of temporarily active hallucinations, delusions, or impulses, rest in bed in the fresh air is the most satisfactory form of general treatment, whatever other special treatment may be adopted.

In carrying out the sanatorium treatment of active insanity, the special object of which is to secure the proper rest of the disordered nervous system, and natural sleep, it is of course necessary also to attend to the diet (which should be moderate to abundant in amount, simple and easily digestible, consisting largely of milk to begin with), to the regular action of the bowels (employing aperients and simple enemata if necessary), to the state of the digestion and circulation, and to the correction, so far as is possible, of any concomitant bodily disorders.

Hydrotherapy and **Electrotherapy** are useful aids to the indoor rest treatment, more perhaps for their stimulant action on the general metabolism than for their reputed sedative effects on the nerve centres. If the patient does not willingly submit to baths, packs, electricity, and the like, their application does more harm than good by irritating and exhausting the subject. **Hypnotics** and **Sedatives** are only justifiable when all other methods fail to remedy persistent insomnia and restlessness in the course of an attack of insanity. There is a wide field of choice from the following—paraldehyde, bromides, chloral, amylene hydrate, trional, sulphonal, neuronal, veronal, isopral, propional, hedonal, dormiol, hypnone, chloralamide, urethane, opium, conium, cannabis indica, and, in extreme cases of restless excitement, morphine, hyoscine, or scopolamine given hypodermically. Hyoscine and scopolamine are given in similar doses (about $\frac{1}{100}$ gr. or less hypodermically) and are said to be identical, but scopolamine (hydrobromate) is said by some to be a more effective motor sedative and hypnotic than hyoscine (hydrobromide). In inveterate cases of restlessness and insomnia it will be found that many of the aforesaid drugs are ineffectual—hence, probably, their number—or if effective at first, soon cease to be so. In such cases it is necessary to find out in an empirical manner the particular drug which suits the individual best, and if tolerance becomes established, to discover another, should a hypnotic or sedative still unfortunately be required.

Psychotherapy.—Every physician recognizes the importance of studying the personal equation of his patient. Much of his own success in practice depends on his own personal equation. J. W. Springthorpe⁹ states the case for mental therapeutics, and points out that the physician obtains better value and results in his ordinary therapeutic measures if he allies them with such factors as suggestion and sympathy. A. T. Schofield¹⁰ and P. Dubois¹¹ similarly lay stress on the force of mind in therapeutics, and the former considers that mind is such an important factor in medicine, in the causation, course, and cure of disease,

that the whole subject of the inter-relationship of the psychical (conscious and unconscious) and the physical should be deliberately taught and studied in the medical curriculum.

Hypnotic Suggestion, a method of treatment which has been much neglected by the medical profession, has been resuscitated in the past year by E. Ash¹² and A. B. Taplin¹³. Ash states that in the induction of hypnosis the key of the matter is the fixation of the attention of the subject, and inhibition or stoppage of thought to such an extent that he loses touch with his surroundings and appears to be asleep, the attention being then readily transferred to the ideas and sensations suggested by the operator.

Colonic and Gastric Lavage.—Since the advent of the toxæmic theory of insanity, which is not yet proved, and especially of the view that much neurosis and psychosis is due to bacterial self-poisoning from the alimentary tract, washing out of the stomach and lower bowel with normal saline solution has been advocated by certain physicians. There are no available statistics to show that these methods give better curative results than the ordinary less radical measures. Where there is evidence of gastric or intestinal catarrh, atony, and dilatation, these methods are employed by many physicians with beneficial results, but it still remains to be seen whether daily lavage of the lower bowel and stomach will cure epilepsy and the neuroses and psychoses in general as claimed by some physicians in Boston¹⁴ and elsewhere. In this connection it may be added that La Place¹⁵ has performed **Appendicostomy** in four subjects of idiopathic epilepsy, with the object of securing more thorough irrigation of the colon (with two gallons of warm water morning and evening), but it is too soon yet to speak as to the permanent results of this method—results, however, which will be looked forward to with interest by the profession.

The use of **Anti-serums** and **Yaccines** in general paralysis of the insane and other psychoses has so far not yielded the beneficial results expected.

Surgical Treatment.—Allan Starr¹⁶, from an extensive experience, no longer recommends any operation on the head in cases of idiocy or imbecility, whether of microcephalic or other nature, nor in cases of hemiplegia or epilepsy dating from infancy or childhood. He considers that operation is not justifiable in idiopathic epilepsy, even though apparently dating from a fall or blow on the head; and that operation is justifiable only in cases of focal or Jacksonian epilepsy, that is in cases of epilepsy in which there is a definite single aura, sensory (e.g. a feeling of numbness in one limb, or a hallucination of sight, hearing, smell, or taste), or motor (e.g. a feeling of muscular twitching), followed at once by a localized convulsion, confined at first to one limb or one side of the face, and possibly "marching" in some cases to other parts of the body, and usually not attended by loss of consciousness. In these cases there is an irritating focus of disease (e.g. a patch of meningitis or of sclerosis of the cortex), and there may be no external marks of injury, although there may be a history of injury. These

operable cases form only 2 per cent of total epilepsy, and in a series of 60 cases of focal epilepsy in which trephining was performed and the focus of disease removed, permanent cure occurred in only about a fifth, or 20 per cent. In the other cases (and Allan Starr observes a similar tendency in persons operated on for tumour or abscess of the brain), the fits are apt to return after one, two, or three years, apparently arising from irritation by the scar tissue.

Dejardin¹⁷ claims to have had a successful result in a case of epilepsy by Lambotte's operation, which is based on the idea that epilepsy results from mechanical pressure of the cortex cerebri by accumulation of serum from a chronic arachnitis, and consists in the introduction of a sterilized non-absorbable seton to act as a permanent drain from the subdural cavity to the subcutaneous tissues.

Max E. White¹⁸, from extensive experience of cranial surgery in insane conditions associated with head injuries, frankly admits that operation is useless in old-standing cases, and is only justifiable if done early, before the insane condition has become established. At the same time he adds later:—"I personally have felt reluctant to carry the knife into cerebral tissue in the absence of well-defined indications for it. We cannot hope to leave anything but scar tissue in our wake, which perchance may prove more troublesome in the cerebral system than the resultant of the trauma."

Gynæcology in the Insane.—M. E. White is similarly conservative after an earlier period of enthusiasm and "*furor secandi*." He recommends that all local measures less heroic than surgery should be tried first; but if the pelvic disease is remediable by the knife it should receive surgical aid promptly and efficiently. Leroy Brown¹⁹ finds that pelvic examination of the female insane reveals pelvic trouble in 75 per cent. Operations were done in 242 patients, in all cases primarily to benefit the physical and not the mental condition, which, in the majority of cases, was not favourable for recovery. The operations comprised 62 abdominal sections, 51 for displaced uteri, and 129 minor plastic cases. The physical condition was improved in 219 cases, unimproved in 18, and 5 died (2 as the result of operation). The mental condition was never aggravated by operation: 90 of the patients improved mentally, this improvement amounting to recovery in 43 cases, in all of which except 4, however, mental improvement was present prior to the operation. The 4 cases comprised 2 with lacerated cervix and perineum (1 melancholiac and 1 maniac), a case of double adnexal disease with retroversion and adhesions (melancholia), and 1 case of puerperal sapræmia, curetted (mania).

The Treatment of Incipient Insanity in general hospitals, Poor Law infirmaries or hospitals, hospital wards of poor-houses, and reception houses. F. S. Toogood²⁰ states that out of more than 2,000 cases of alleged insanity treated during the past ten years at Lewisham Infirmary, 50 per cent recovered, 10 per cent died, and only 39·5 per cent were sent to asylums. Papers urging the treatment of incipient insanity in

general hospitals have during the past year been published by C. Meyers²¹ and E. Goodall²². It is estimated that if the general hospitals and infirmaries of cities and towns were equipped with mental wards, 50 per cent of certified lunacy would be prevented, obviating, therefore, in many cases the so-called "stigma" of insanity, not to mention also that of pauperism. The "stigma" of pauperism will not be obviated by the treatment of incipient insanity in the sick wards of poor-houses, nor probably will the "stigma" of insanity be obviated by treatment in reception houses solely for mental cases. Apart, however, from such sentimental considerations, at the present time, when psychiatry is drawing closer and closer to general medicine, and when we consider that the proper treatment of mental disorders in their early stages can only be based on a proper understanding of the morbid factors and processes then at work, any measures which will tend towards a narrow specialism or a separation and, perhaps, divorce of psychiatry from general medicine cannot be too strongly deprecated. It is impossible to say too much in favour of the nursing, treatment, and clinical investigation of incipient insanity as of other diseases, in hospitals and infirmaries, from the points of view of (1) The benefit to the patients themselves; (2) The increased efficiency of the nursing profession; (3) The improvement of the clinical training of medical students in the recognition and treatment of the insanities at their early stages, when it is most important for the medical practitioner to recognize and treat them; and (4) The gain that would accrue to the scientific study and practical treatment of insanity as carried on in the hospitals and infirmaries of medical schools and centres by competent physicians constantly in touch with other active workers and teachers in medicine and science. Further, in the great majority of curable mental disorders the "rest cure" is eminently suitable in the earlier stages.

REFERENCES.—¹*L'Informateur des Alienistes et des Neurologistes*, Aug. 1906, *Gaz. d. Hôp.* Aug. 9, 1906, *Progrès Méd.* Aug. 11, 1906; ²*Studies in Clinical Psychiatry*, 1906; ³*Jour. Ment. Sci.* July, 1906; ⁴*Ibid.* April, 1904; ⁵*Riv. di Patol. Nerv. e Ment.* 1906; ⁶*Med. Rec.* Feb. 10, 1906; ⁷*Amer. Jour. Insan.* Oct. 1906; ⁸*Amer. Jour. Psych.* Jan. 1906; ⁹*Lancet*, Nov. 18, 1905; ¹⁰*Brit. Med. Jour.* Sept. 29, 1906; ¹¹*Ibid.*; ¹²*Lancet*, Jan. 27 and Aug. 25, 1906; ¹³*Brit. Med. Jour.* April 28, 1906; ¹⁴*Bost. Med. and Surg. Jour.* Aug. 3, 1905; April 19 and 26, May 3, and Aug. 23, 1906; ¹⁵*Amer. Jour. Med. Sci.* June 2, 1906; ¹⁶*Jour. Amer. Med. Assoc.* Sept. 22, 1906; ¹⁷*Arch. Prov. de Chir.* 1906; ¹⁸*Amer. Jour. Insan.* Jan. 1906; ¹⁹*Ibid.*, Jan. 1906, and *Amer. Jour. Med. Sci.* Feb. 1906; ²⁰*Lancet*, Sept. 15, 1906; ²¹*Brit. Med. Jour.* Oct. 20, 1906; ²²*Ibid.* Oct. 27, 1906.

INTRACRANIAL HÆMORRHAGES OF THE NEW-BORN.

Purves Stewart, M.D.

A large proportion of cases of cerebral diplegia in newly-born children are due to intracranial hæmorrhage, not arterial in origin, but from rupture of the delicate and poorly-supported veins of the cerebral cortex. Such injury may be the result of traumatism during labour, or it may be caused by distension and rupture of the veins during post-partum asphyxia, just as in certain cases of whooping

cough or of infantile convulsions the veins may rupture from passive congestion.

In an important paper Cushing¹, of Baltimore, describes the result of a series of observations on the brains of still-born children, and records the interesting fact that a considerable proportion of them had died with a cortical intracranial hæmorrhage such as we have described. Owing to the distensibility of the cranial vault in the new-born child, many cases of cortical hæmorrhage doubtless survive, which would certainly prove fatal were the bones rigid as in the adult. On the other hand, the overlapping of the parietal bones during expulsion of the head tends to rupture the cortical veins by tearing them away from the superior longitudinal sinus. As a result, the clot which is found in the intracranial hæmorrhages of new-born children is generally median in position, and it therefore exercises its chief pressure upon the cortical centres for the lower limbs. Basal hæmorrhages are less common, and Cushing suggests that some cases of general athetosis may be the result of basal hæmorrhages infiltrating the optic thalami.

The DIAGNOSIS of intracranial hæmorrhage in the new-born should not be difficult. Firstly, we have a history of prolonged labour, and the child when born is found to be more or less in a state of asphyxia or cyanosis. The fontanelle is bulging, and may be so tight as to show no pulsation. In fact its bony outlines, in consequence of the tension, may be impossible to feel. Lumbar puncture will show the presence of blood in the cerebrospinal fluid. Convulsions are frequent, and if they do not appear until several days after birth, they may be more or less unilateral. Differences in the pupils and ocular palsies are not uncommon. The signs of paralysis of the limbs, especially of the lower limbs, are not generally made out at this early date; it is usually not till the child is several months old that the spastic hemiplegia or diplegia, or the blindness, deafness, or dementia, become evident. Many of the patients subsequently become epileptic.

TREATMENT.—From what has been said, it is obvious that if anything is to be done to relieve the condition, it must be by attacking the primary cause. No other means of treatment offers any prospect of cure. Therefore Cushing proposes to operate on such cases, **Opening the Skull**, and removing the clot before the subjacent brain has been irretrievably damaged. He raises a large osteoplastic flap from the parietal region and removes the cortical clot, partly by means of blunt forceps, partly by irrigation with warm saline solution. Cushing records four such cases on which he operated. Of these, two died, a third made an excellent recovery and is now apparently normal in every respect, the fourth also did well and is apparently normal, though it is too early to judge of the mental condition.

These results are worthy of careful consideration. A point of importance in connection with operative procedures is that a new-born child stands such operations well, contrary to what is usually stated in the text-books. Provided due care be taken to avoid unnecessary

loss of blood, the amount of trauma during such an operation is less than that which the child's head has to undergo during the process of birth. Finally, it is to be borne in mind that such operations, if they are to have really beneficial results, must be done early—practically as soon as the diagnosis is established.

REFERENCE.—¹*Amer. Jour. Med. Sci.* Oct. 1905.

IRIS AND CILIARY BODY (Diseases of). *A. Hugh Thompson, M.D.*

Sympathetic Ophthalmitis.—The causation of this disease is still among the most disputed questions in ocular pathology. Thirty years ago the most generally received theory was that the ciliary nerves alone were concerned in the transmission of the disease from the primarily affected eye to the second one. Twenty years ago the belief had gained ground, largely through the experiments of Deutschmann on rabbits, that the inflammation was directly propagated from the first to the second eye by way of the optic nerves and chiasma. Neither of these theories has been able to stand against the criticisms of subsequent investigators. With the rise of the science of bacteriology, it was natural that the source of infection should be looked for in the general blood-circulation in the shape of a micro-organism possessing an isolated action on the ciliary body alone, and this theory, or some modification of it, seems to be the most popular with pathologists at the present time. One such modification has been proposed by Golovine¹, who believes that the carriers of the disease are not micro-organisms but "cytotoxins." These are formed, he supposes, as the result of the destruction of the ciliary cells in the eye primarily attacked. Being conveyed into the general circulation, they are capable, as soon as they reach the ciliary body of the sound eye, of setting up an inflammation similar in character to what had attacked the first eye. The theory allows for the possibility of the poison being neutralized, while yet in the circulation, by antitoxins, which would account for the uncertainty of its further action. The sort of experiments by which these conclusions are supported may be gathered from the following: "An emulsion of the ciliary body and iris of a dog was injected into the peritoneal cavity of a rabbit. Serum from a rabbit thus treated was inoculated into dogs, both locally and into the blood-stream. Injection of the serum into the anterior chamber or vitreous body produced irido-cyclitis, the intensity of which depended on the number of injections. The clinical observation was confirmed by pathological examination of the inflamed eye. Injection of cytotoxic serum into the blood of dogs produced no obvious evidences of ocular inflammation, but microscopical investigations revealed the existence of an inflammation limited exclusively to the ciliary body."²

Zur Nedden³, from numerous experiments on rabbits, believes that he has isolated the true bacillus of sympathetic ophthalmitis—a very small one, resembling the pseudo-diphtheritic bacillus. He finds that it has the property of setting up in rabbits a plastic irido-choroiditis by way of the circulation, and sometimes changes in the internal organs as well.

With regard to all such experiments it will be very well to bear in mind the warning of Randolph⁴, himself an experimenter and authority on sympathetic ophthalmia. "Rabbits," he says, "seem to present peculiarities in their freedom from eye diseases, certainly a noteworthy fact when we take into consideration man's susceptibility in this direction, or even that of the dog. For this reason I regard rabbits as unsuitable subjects for illustrating the eye affections met with in man, and, as all the experiments have shown, peculiarly unfitted for the purpose of throwing any positive light upon the pathogenesis of sympathetic ophthalmia."

Far exceeding in importance the papers already quoted, is one by Fuchs⁵, based on a microscopic examination of all the eyes in his collection which have been excised for fear of sympathetic disease. Among the whole number, 35 were found in which the lesions were considered by Fuchs to be typical of sympathetic ophthalmitis, and the remarkable statement is made, that on subsequently examining the clinical records it was found that all these eyes, with two doubtful exceptions, had actually set up sympathetic ophthalmitis, whereas none of the other eyes examined had done so. This implies that the iridocyclitis that is capable of setting up sympathetic disease is something quite different, not only in its result but in its origin, from septic endophthalmitis. Microscopically, the difference is thus stated: In the sympathetic form of the disease "the cellular infiltration begins beneath the intact retinal layers, and destroys the outer of these layers, while the inner remains intact. In endophthalmitis the first exudation cells are found upon the inner surface of the retinal layers, of which the inner is soon destroyed, while the outer, as well as the ciliary body, shows at first but little cellular infiltration." In sympathetic ophthalmia, the choroid is the portion of the uvea which is usually most severely affected. In septic endophthalmitis, it is usually the least. Whatever the pathological factor may be that causes sympathetic disease in the second eye, Fuchs agrees with most recent observers in opining that the route by which it travels is neither the ciliary nor the optic nerves, but the general circulation.

Etiology of Primary Iritis.—Gutmann⁶ has investigated 150 cases of primary iritis taken from the university clinic in Berlin, from the point of view of causation. Syphilis accounted for 47, or 31·3 per cent; rheumatism, including gonorrhœal cases, for only 10, or 6·6 per cent; of the remaining cases a large proportion, namely 27 per cent, are put down to tubercle (this is no new view in Germany, although in England tubercle is regarded as only a rare cause of iritis); and another large proportion, namely 18·6 per cent, to chronic Bright's disease and circulatory disturbances. This also is a cause of iritis which has as yet attracted very little attention in England. On the other hand, auto-intoxication (e.g., through decayed teeth or pyorrhœa alveolaris) is a cause not included in Gutmann's figures, but which is becoming more recognized in England (Cf. *Med. Ann.*, 1906). In connection with this subject, Elschnig⁷ says there are two forms of

iridocyclitis in which auto-intoxication through the gastro-intestinal tract may be confidently looked for. "The first occurs especially in women, and is characterized by a chronic course, deposits in the anterior chamber, and opacities in the vitreous. The patients give a history of constant digestive irregularities and constipation. An acetone-like odour of the breath, and the presence of indican in the urine, point to the presence of toxins of intestinal origin; and a therapeusis directed towards the digestive troubles is the only one which influences the ocular condition for the better. The second form is a recurrent iritis; the subjects of it are apparently quite healthy individuals, often men about the middle period of life; one eye is attacked by acute iridocyclitis, recovers, and after a longer or shorter interval a second attack occurs, and this process is repeated until, in many cases, the eye becomes blind. Antisyphilitic remedies are not of the slightest use, but, on the other hand, **Treatment of the Digestive Organs** produced complete arrest of the process in five out of seven cases, while in the other two, in which it was very imperfectly carried out, there was considerable amelioration." As to drugs, in cases with an acute onset, **Calomel** is the sovereign remedy. In the relapsing and chronic affections "a course of disinfection of the intestine by **Guaiacol Carbonate** ($7\frac{1}{2}$ gr. three or four times a day after food) for four or six weeks several times a year, and finally supplemented by a **Carlsbad Cure**, seems to be the best treatment."

REFERENCES.—¹*Arch. d'Ophthalm.* Feb. 1905, and *Ophthalm.* Oct. 1905; ²*Ophthalm.* 1905, p. 500; ³*Arch. f. Ophth.* vol. lxii. 2., *Ophth. Rev.* June, 1906, and *Scot. Med. and Surg. Jour.* May, 1906; ⁴Norris and Oliver, vol. iii, p. 755; ⁵*Graefe's Arch. f. Ophth.* xlii, 2, p. 365, and *Ophth. Rev.* Dec. 1905; ⁶*Ophth. Rev.* March, 1906; ⁷*Klin. Monats. f. Augenh.* Nov. 1905, and *Ophth. Rev.* April, 1906.

KELOID.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The present views as to etiology and treatment are summed up in a paper by Morris¹. Formerly there were two divisions, spontaneous and secondary, but the first is now admitted to arise from some slight lesion. Microscopically, keloid consists of a tough layer of connective tissue made up of dense collagenous bundles, and is histologically midway between a scar and a sarcoma. The theory of local infection has been suggested, and Legrain introduced a piece of keloid from a tuberculous scar under the skin of a rabbit, with the result that local tuberculosis developed.

Various methods of treatment have been recommended, their very multiplicity indicating their value: 10 to 25 per cent **Ichthyol Ointment**, **Iodine**, **Lead**, and **Mercurial Plasters**, and the injection of 10 to 15 per cent **Thiosinamin** in alcohol. Brocq has had fair success with **Electrolysis**, and Crocker thinks the effect of this is better when a surgical needle curved in the flat is used attached to the negative pole. He passes 3 ma. of current during 20 to 30 seconds. Steiner, of Leipzig, in *acne keloid* uses a sulphur ointment, viz., **Thiolon**, spread on

the part, and then throws the **Arc Light** on the part through this. White found **Thyroid Extract** to be curative.

All these methods, according to Morris, who quotes five successful cases, may be dropped in favour of the **Finsen Light**, which is the curative agent he applies. In extensive areas X rays are more effective, but the cosmetic results are not so good.

REFERENCE.—¹*Pract.* Dec. 1905.

KERATITIS. (*See* CORNEA.)

KIDNEY (Abscess of). (*See* PERINEPHRITIC ABSCESS.)

KIDNEY (Movable).

E. Hurry Fenwick, F.R.C.S.

ETIOLOGY.—Longyear¹ describes a cord-like band passing downwards from the lower pole of the kidney and separating the organ from the bowel. This structure is formed by the covering of the longitudinal fibre of the fibrous net-work which forms the framework of the fatty capsule. This band is attached to the posterior surface of the ascending colon behind the peritoneal reflection, extending down to the junction of the ileum. The writer claims that this nephrocolic attachment is the most important feature in the etiology of movable kidney. The full cæcum, in its efforts to force its contents upwards, makes traction downwards on the kidney by means of this attachment.

Hutchinson, junr.² attributes the frequency of movable kidney on the right side to the different anatomical relations between the colon and kidney of the two sides. The splenic flexure lies on the top of the kidney, the descending colon beside it; both are firmly anchored by peritoneum. The mesocolon and branches of the inferior mesenteric cross the kidney and keep it in position. On the right side, the cæcum lies just below the kidney, and at first the ascending colon runs to the inner side. Although the colon subsequently lies more in front of the kidney, the hepatic flexure never anchors it in the way the splenic flexure does the left kidney. On the front of the left kidney, especially fixed in its lower half, is the fascia of Toldt, which is supposed to be formed from fusion of two layers of peritoneum originally belonging to the descending colon. On the right side, there is no corresponding fascia. In adult life, additional causes account for the floating condition, such as repeated pregnancies, abdominal strain, and the rapid absorption of perirenal fat.

Victor Bonney³ states that the principal support of the kidney is the perinephritic fascia, and it is the relaxation of it that is the cause of the movable kidney.

DIAGNOSIS.—Bonney states that the patients must be examined in the standing posture, and by means of the manœuvres collectively termed "palpation." He calls attention to the following physical signs:—

1. Loss of expiratory return. In women with flaccid abdominal walls, the diaphragm descends lower than normal, and carries the kidney with it, but the kidney returns on expiration. With movable

kidney, the relaxed condition of the perinephritic fascia allows the kidney to slip off the diaphragm at the quadratus lumborum muscle, and so to be independent of its movement. It therefore does not return on expiration. This sign can only be demonstrated by examination in the standing posture.

2. The oblique or transverse position assumed by a movable organ. This also must be searched for in the standing posture.

He states that in cases exhibiting lost expiratory return alone, the symptoms are absent or slight, but in those in which renal rotation exists as well, symptoms often severe are always present.

Hutchinson, junr., admits the difficulty in diagnosis in many cases. The displaced organ often lies just under the liver, in the position of a distended gall-bladder, and it often causes "biliary symptoms," or it may suggest a pyloric tumour, and cause the symptom of pyloric obstruction. He points out that the floating (movable) kidney does not constantly float, and repeated examinations are essential in a doubtful case. He lays especial stress on the symptoms which have a real physical explanation, and of which interference with the gastric and hepatic function are especially noteworthy. He considers the neurotic condition which is often found in subjects of floating kidney is largely the result of the symptoms long continued, and is to be avoided in many cases by early fixation of the organ.

Amongst errors of diagnosis he gives the following conditions which have been mistaken for movable kidney: Gastric ulcer, tumour of the pylorus, gall-stones, cholecystitis, and appendicitis.

Elder⁴ records a case of paranephritic cyst simulating floating kidney. The movable tumour was first discovered by the patient. At operation a movable cystic tumour was found in the paranephritic tissue, and the kidney was in its normal position. Removal of the cyst was followed by a cure.

TREATMENT.—Longyear advises the **Fixing of the Nephrocolic Ligament** referred to above into the upper angle of the usual lumbar incision without severing it from the colon, as this is attended with grave danger of wounding the bowel, and fixing any redundant mesentery into the lower angle of the wound. He claims that the kidney thus fixed has an additional advantage of not being held in an immovable position.

Hutchinson, junr., advises against operation in patients with pendulous abdomen, and with marked enteroptosis, but he thinks that the importance of displacement of the stomach and intestines has been exaggerated. As a general rule, he orders an abdominal belt in these cases. He thinks that of all surgical appliances for the replacement and fixation of a floating kidney, there is hardly one that really answers the purpose for which it is devised, and if relief is obtained by an instrument, nephrorrhaphy would still be justified, as removing the necessity to wear one. He fixes the kidney to the muscles of the lumbar region by three or four stitches of kangaroo tendon passed through the cortex of the organ, and closes the wound without

drainage. The patient is kept on her back for a fortnight or three weeks.

He claims (1) That whilst a truss or belt pressure may undoubtedly suffice in slight cases, **Nephrorrhaphy** is the most certain method of treatment; (2) That kangaroo tendon is admirably adapted for nephrorrhaphy, the use of silk being attended with the risk of causing tedious sinuses.

REFERENCES.—¹*Amer. Jour. Obst.* Nov. 1905, quoted *Med. News*, Dec. 30, 1905; ²*Clin. Jour.* Oct. 25, 1905; ³*Ibid.* Oct. 18, 1905; ⁴*Mont. Med. Jour.* Dec. 1906.

KIDNEY (Tuberculosis of). (See TUBERCULOSIS.)

LABOUR.

Arthur E. Giles, M.D., B.Sc., F.R.C.S.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

The Treatment of Normal Labour.—Horrocks¹ published a paper in the early part of the year which raised a considerable controversy in the medical press. The object was to make a protest against the growing tendency to replace more or less the forces of nature by artificial aids to delivery. He strongly advocated the leaving of normal cases alone, and deprecated the use of forceps, expression of the placenta, the various methods of "saving the perineum," and other manœuvres or operations designed for the shortening of labour. His views were warmly supported by some, but disputed with equal vigour by others. There can be no doubt that inexperienced, reckless, or mistaken interference with normal labour is to be condemned; but in the writers' opinion there can equally be no doubt that artificial aid towards the shortening and alleviation of labour can be given with perfect safety if carried out with due care and intelligence. There can be no doubt that Horrocks is correct when he says that the vast majority of labours left to nature to complete, terminate well. It is also true that instrumental labours treated with the same skill and asepticity as are demanded in a surgical operation terminate equally well, and that with an immense saving of pain to the patient and time to the practitioner. It is in artificial assistance carelessly and incompletely given that the danger lies. Rather than interfere thus, the labour should undoubtedly be left to nature.

Herman² has written an interesting paper on the **Prevention of Difficult Labour**. He points out that many of the complications of childbirth may be rectified if their imminence is appreciated during pregnancy. He specially advocates routine examination about the seventh month of pregnancy. This is certainly most desirable, and the profession should lose no opportunity of educating the public as to the advisability of such a course. At present, besides the natural objection to examination, there is a general impression amongst women that such examinations are unnecessary and meddling. Herman favours induction of premature delivery some weeks before term in all cases in which it is found that the head is unduly large for the pelvis.

A detailed description of the management of normal labour according to the most modern ideas has been given by Purslow³, and it is interesting to notice that this authority makes a plea for more patience in the delivery of the placenta, and deprecates premature attempts to extrude it by artificial means. He insists that the membranes are more likely to be retained by this procedure than when nature is allowed to take her own course.

This subject has been effectively dealt with by Blacker⁴ in an erudite paper. The conclusions at which he arrives, both from his own experience and from the writings of many other authorities, are as follows :—

1. That the tendency to shorten the interval of thirty minutes prescribed by Credé before practising his method of expression of the placenta is to be deprecated.

2. That such practice directly favours retention of membranes or portions of placental tissue.

3. After the fall in the level of the fundus of the uterus that indicates the separation of the placenta, from ten to fifteen minutes should still be allowed to elapse before expressing it, unless hæmorrhage is going on.

4. That if, at the expiry of thirty minutes, expression fails to extrude the placenta, no harm will result (in the absence of urgent symptoms) from waiting a further hour in the hope of a natural delivery.

5. Where manual removal is necessary, sterilized indiarubber gloves should be worn.

Contracted Pelvis.—Kannegiesser⁵ reports 21 cases in which **Pubiotomy** was performed. All the mothers recovered, and 17 of the children survived. A considerable proportion of the patients, however, had untoward complications as a result of the operation. Thus, in three patients there were vaginal lacerations communicating with the operation site, three more suffered from hæmaturia, whilst a fourth had a vesical fistula, which, however, closed in six weeks. In four, large hæmatomata formed at the site of the bone section, but in no instance did these extravasations suppurate. The hæmorrhage in this accident comes apparently from the torn crus clitoridis.* In all the cases Giglis' wire saw was used subcutaneously after the method of Doderlein in preference to open incision.

Duhrssen⁶ advocates this operation warmly. It has been performed 115 times, with 6 deaths. He favours the subcutaneous method, the saw being guided round the bone by a specially devised trocar. To avoid laceration of the vagina, he advises the making of a freeing incision of the outlet on the same side as the pubiotomy. Schauta⁷, Hohlweg and Reiferscheid⁸, and Schmidt⁹ also report successful cases, whilst Truzzi¹⁰ directs attention to the permanent increase in size in the pelvis that results from this operation. All these observers agree that the operation is superior to symphysiotomy.

That this proceeding will ever become an operation of election in this country, the writers do not believe. The "slight complications" so airily talked of by certain authorities will, we think, be regarded

more seriously by the bulk of practising obstetricians. The safety with which **Cæsarean Section** is now performed renders this operation the proper course for all parturient cases in which surgical requirements can be efficiently obtained and in which the woman's condition is good. For the remainder, **Perforation** should be performed. In pregnancy, **Induction** should be advised if the degree of contraction permits of a viable child passing through the pelvis. In contraction too extreme for this, pubiotomy is absolutely contra-indicated.

REFERENCES.—¹*Brit. Med. Jour.* Mar. 1906; ²*Ibid.* June, 1906; ³*Ibid.* June, 1906; ⁴*Lancet*, April, 1906; ⁵*Arch. f. Gyn.* lxxviii. 1; ⁶*Berl. klin. Woch.* Dec. 1905; ⁷*Centr. f. Gyn.* 1905, No. 20; ⁸*Ibid.* 1905, No. 42; ⁹*Med. Rec.* May, 1905; ¹⁰*Ann. di Ostetricia*, Sept. 1905.

LARYNX (Papillomata of the).

P. Watson Williams, M.D.

Should papillomata in the larynx of a child be removed? Opinion is still divided on this question, the difficulty being that however radically the growths are extirpated, they always tend to recur in young children. Payson Clark¹ states that they will not yield to any form of treatment until the period of active growth has passed. Like the late Hunter Mackenzie, Clark now advocates tracheotomy and non-interference with the growths. He gives an account of 14 cases in whom the affection commenced between the ages of one and eight years. Four cases were operated on without preliminary tracheotomy: 1 was successful, 1 required tracheotomy later, 1 was lost sight of, and 1 died. In 10 cases a preliminary tracheotomy was performed, and 4 died. He therefore recommends that tracheotomy alone should be done, and no interference with the growths attempted earlier than ten years of age.

Paterson² has simplified the operative treatment by his modified Kirstein's tube spatula and his own cutting forceps, and by this direct method he finds he can make a clearance of the larynx in a short space of time, and that recurrence is the exception. The child is lightly anæsthetized with chloroform, and with the head hanging over the end of the table, the operator introduces the tube spatula so that the distal end is just in front of or below the epiglottis, the pharynx and larynx having been previously painted with 10 per cent cocaine solution to which a small amount of adrenalin solution has been added. In this position the larynx can be exposed, Paterson's forceps introduced, and the growths removed. When there is subglottic growth he often prefers Lõri's curette for the removal of the growths which cannot be accomplished readily by the forceps.

REFERENCES.—¹*Bost. Med. and Surg. Jour.* Oct. 1905; ²*Lancet*, July 21, 1906.

LEAD POISONING. (See BLOOD EXAMINATION.)

LEISHMAN-DONOVAN BODIES.

J. W. W. Stephens, M.D.

L. Rogers¹ states that cultivation is more certain if the citrate solution (2-5 per cent) to which the spleen blood is added be faintly acidulated with citric acid.

Aleppo Button.—Coppin² treats these ulcers in the following way. He first applies a **Poultice** to get rid of crusts; then, after protecting the surrounding skin, a **Cantharides Ointment** is applied. The ulcer is then washed with hot water, and **Boracic Ointment** applied. The cauterizing process is repeated every third day; three or four applications are necessary.

Tropical Splenomegaly.—W. E. Musgrave, W. B. Wherry, and P. G. Woolley³ describe the clinical characters of this affection as seen in the Philippine Isles. (1) The disease begins as a remittent or intermittent fever resembling malaria or dengue, and is accompanied by enlargement of the spleen; (2) The spleen enlarges rapidly, reaching a maximum after the second or third attack of fever; (3) There is usually slight jaundice, gastro-intestinal disturbance, and conjunctivitis. There is a tendency to hæmorrhages in the mucous membranes and the skin; (4) Oedema is common on the legs and face; (5) Anæmia, emaciation, and cachexia develop gradually in all cases. No Leishman-Donovan bodies were found in any of these cases.

Tropical Ulcer.—According to Bouffard⁴, this form of phagedenic ulcer is common among the Arabs at Djibuti (Red Sea). It occurs most commonly on the external malleolus. The pus always contains a long filamentous bacillus. The treatment consists in washing with 1-1000 **Permanganate** solution; then the foot is kept in a bath of the solution half this strength for half an hour, and finally permanganate fomentations are applied and changed every three hours. When the bacillus disappears from the pus, and when all fœtor has disappeared, fomentations of 1 per cent **Picric Acid** are used.

REFERENCES.—¹*Brit. Med. Jour.* Mar. 1906; ²*Arch. f. Schiffs u. Trop. Hyg.* May, 1906; ³*Johns Hop. Hosp. Bull.* Jan. 1906; ⁴*Ann. d'Hyg. et de Méd. Colon.* 1905, p. 333.

LENS (Diseases of the).

A. Hugh Thompson, M.D.

In an interesting lecture on "The Lens in Health and Disease," Sir Job Collins¹ emphasizes the fact, not sufficiently known, that the growth in size of the normal crystalline lens is continuous, from birth to old age. He further contends, what is contrary to the generally received view, that the specific gravity of the normal lens remains practically constant through life. If this latter contention be right, two important deductions follow, first, that the generally accepted theory of accommodation is incorrect, since this is based on the assumption that the lens gets continuously denser from the early years of life to old age, and secondly, that senile cataract, instead of being an exaggeration of a process normal in old age, is an entirely pathological product. Whereas the normal senile lens is large, and of about the same density as the lens of youth, the lens of senile cataract is small, and comparatively solid. Since these views are contrary to those generally held, and are based on observations taken so long ago as 1889, it is obviously desirable that the measurements, and especially that of the specific gravity of the normal lens at different periods of life, should be repeated.

The details connected with the **Operation for Senile Cataract** are a never-failing source of interest to the ophthalmic surgeon. The following points are taken, partly from an interesting symposium on the subject published last year², partly from other sources:—

Choice of Cases on which to Operate.—Pagenstecher³ says, "Operate only upon mature cataract, and in other cases mature by massage through the cornea, after preliminary iridectomy." Hess, on the other hand, operates on any patient whose sight is too defective to allow him to follow his usual occupation, irrespective of the "ripeness" or otherwise of the cataract; and Critchett⁴ agrees with him, though, if he anticipates much soft cortical substance, he prefers to perform a preliminary iridectomy and to wait for five or six weeks before removing the lens. This probably represents the most orthodox practice both in England and on the Continent. The day is past when a patient with senile cataract had to wait long months in almost total blindness until, as the text-books put it, the iris casts no shadow on the lens. The case is very different where the fellow eye has been successfully operated on, or where it has remained unaffected. Here there is no sort of reason for being in a hurry. Marshall⁵ even goes so far as to say that, except in some cases of traumatic cataract, nothing would induce him to operate on one eye so long as useful vision remained in the other, for no surgeon, he says, can afford to ignore the possibility, even though remote, of sympathetic ophthalmitis. Even Marshall, however, would no doubt admit that, in the case of the two eyes being unequally affected with cataract which is progressing in both, it is well to operate on the worse of the two without waiting until the better one is so bad as to cease to be useful. Not to operate in such a case would often mean a totally unnecessary waste of three months' working life.

Preparation of the Patient before Operation.—It is of course essential to cure any conjunctival catarrh that may be present. To ensure this, many surgeons insist on the excellent device of a "test dressing" the night previous to an operation. If any discharge is present on the pad in the morning, the operation must be postponed for a few days while the conjunctiva is being treated with a zinc or silver salt. The case of a diseased lacrimal sac is far more serious, and in any case where there is regurgitation, an operation for cataract is distinctly contra-indicated. Recent cases may often be cured by simple syringing, but in those which have gone beyond this stage it is highly advisable to excise the lacrimal sac as a preliminary to extraction. Complete sterilization of instruments and lotions is essential, and has succeeded in reducing cases of suppuration to something like 1 per cent, as compared with a far higher percentage in the pre-aseptic days, even in the hands of the best operators. Instead, however, of using more or less strong antiseptic lotions to the eye itself, most ophthalmic surgeons now rely on the mechanical effects of free irrigation with warm saline solution or merely boiled water. Absolute immunity from the deplorable complication of suppuration is hardly to be

expected, for the simple reason that, as Marshall⁶ remarks, it is practically impossible to render the conjunctival sac absolutely sterile, there being necessarily a direct communication with the lacrimal sac and the nose. The results already attained, however, prove the importance of minimizing the sources of infection, even though it may be impossible to completely eliminate them.

Employment of a Speculum.—Here, practice differs very much. Some surgeons dispense with it altogether. It may, says Critchett⁷, be actually harmful, "since the wings of the speculum afford a powerful leverage for the strong spasmodic effort which has so often ruptured a delicate hyaloid membrane, and wrecked an otherwise promising operation." Others, such as Landolt⁸, use a speculum during the corneal incision, and remove it before the actual extraction of the lens. Others, again, have devised special forms of speculum. One of the best is Lang's, which succeeds in keeping the eye-lashes well out of the way of the operator.

The Incision.—This is no longer the matter of acute controversy that it was in the early days of the operation. Almost all operators now adopt the sclerocorneal incision with a Graefe knife, and make it larger or smaller according to the anticipated size of the lens.

Iridectomy.—On this subject there is little to add to what was written for the *Medical Annual* for 1905 (article "Cataract"). While all would admit that the most ideally perfect results are obtained from the "simple" operation, there are few who would deny that the risks of prolapse and of iritis, especially when there is much soft cortex to be evacuated, are best avoided by an iridectomy. In cases of unripe cataract the best practice, as has already been mentioned, is to perform an iridectomy as a preliminary operation.

Capsulotomy.—This is generally done with a capsulotome, but some surgeons do it with the Graefe knife used for first incision. Marshall remarks that the great advantage of this plan is that the point must be sharp, or it would never have got into the anterior chamber at all. It is indeed possible, in the operation for cataract, to dispense with all instruments except the Graefe knife, as in the practice of Trousseau⁹, who operates without a speculum and does not do an iridectomy. As was mentioned in the *Medical Annual* for 1905, Major Smith does not perform a capsulotomy at all, but extracts the lens in its capsule entire, and a brisk controversy has since arisen among Indian operators on the subject. Some, such as Captain Oxley¹⁰ and Major Birtwood¹¹, follow Major Smith, while Major Herbert¹² strongly opposes him. The acknowledged drawback of the procedure is the greater frequency that it entails of loss of vitreous; the percentage of cases in which this accident occurs was as low as 6 or 7 per cent in Major Smith's statistics, but Birtwood had 47 per cent escapes in a first series of cases and 35 per cent in a second series¹³. "I don't think," he says, "that the average operator would reduce his escapes to below 30 per cent." Now this accident may be, and no doubt generally is, of practically no importance; but on the other hand it may be most serious. Herbert¹⁴,

in examining the visual results of 22 operations in which the vitreous had been lost, found that in 3 cases the patients were able to see only moving bodies afterwards, and 2 of these 3 almost certainly had detachment of the retina. Major Smith¹⁵ replies to the effect that whatever danger there may be connected with escape of vitreous is far more than counterbalanced by the two great advantages which it ensures, viz., absence of retained soft lens matter which may set up iritis, and freedom from subsequent capsular complications requiring further surgical interference. His opinions are based on personal experience of 9000 cases in which he performed his operation¹⁶.

Evacuation of the Lens.—This may be done by pressure of the spatula or the handle of the Graefe knife, while some surgeons (e.g., Lapersonne) prefer to employ digital massage through the lower lid. The evacuation of soft matter after the escape of the nucleus always presents most difficulty. Three methods of overcoming it have been devised, but neither has as yet come into general use: (1) McHardy's method of artificial ripening, mentioned in the *Medical Annual* for last year; (2) Irrigation of the anterior chamber by a flow and return syringe such as McKeown's; (3) Major Smith's operation for extraction in the capsule entire, discussed above. The objection to the first is the danger of dislocating the lens: to the second, the complicated nature of the apparatus; to the third, the frequency of vitreous prolapse.

Post-operative Capsular Complications.—This subject was discussed by Treacher Collins at the 1905 meeting of the British Medical Association¹⁷. He dealt with the complications under two heads: (1) Those resulting from adhesion of the lens capsule to the extraction scar; and (2) Those resulting from opacity occurring in connection with the lens capsule after extraction. The former class are especially dangerous, and may lead to such disastrous results as severe iridocyclitis, secondary glaucoma from dragging upon the iris, and even sympathetic ophthalmitis. These adhesions of the capsule, whether direct, or indirect by means of a strand of lymph, are best dealt with in the same manner as with an anterior synechia of the iris, by means of Lang's knives. The second class of complications may be due to three causes: (a) Retained lens substance; (b) Wrinkling of the anterior capsule with new growth of cells lining it, and (c) Adventitious fibrous tissue. The procedure which Collins has found best to avoid these opacities is, instead of incising the anterior capsule with a capsulotome, to remove a portion of it with capsule forceps. Of his first 100 cases treated in this way, only 15 required subsequent needling from their vision being less than $\frac{6}{18}$. In his second series of 100 cases only 4 required needling, and of the whole number 25 per cent got full vision, $\frac{6}{6}$, with only the single operation.

REFERENCES.—¹*Brit. Med. Jour.* Dec. 2, 1905; ²*La Clin. Ophthalm.* Nov. 1905 to Jan. 1906, abstr. in *Ophthalm.* Mar. and April, 1906; ³*Ophthalm.* Mar. 1906, p. 139; ⁴*Ibid.* Mar. 1906, p. 131; ⁵*Ibid.* p. 125; ⁶*Ibid.* p. 122; ⁷*Ibid.* p. 112; ⁸*Ibid.* p. 134; ⁹*Ibid.* p. 133; ¹⁰*Ibid.* p. 153; ¹¹*Ind. Med. Gaz.* June, 1906; ¹²*Ophthalm.* Mar. 1906, p. 113; ¹³*Ind. Med. Gaz.* June, 1906; ¹⁴*Ophthalm.* Mar. 1906, p. 113; ¹⁵*Ind. Med. Gaz.* April 10, 1906; ¹⁶*Ibid.* Sept. 1905; ¹⁷*Brit. Med. Jour.* Aug. 26, 1905.

LEPROSY.*J. W. W. Stephens, M.D.*

J. Max¹, in a review of recent leprosy literature, records that Nicolle, by the injection of leprosy tissue into a monkey (macacus) succeeded in producing, two months later, a hard, indolent swelling in which a few leprosy bacilli were found. Deycke-Pascha and Reschad Bey have grown out of leprosy tissues a streptothrix in broth. Injections of these cultures in the same patients produce an evident improvement in symptoms, especially in the subjective ones. J. Neumann records a case of cure of leprosy by administration of **Chaulmoogra Oil** 200–250 drops daily, combined with **Salol** and **Iothion**. Tourtoulis Bey insists on the prolonged use of chaulmoogra, and where this is not borne by the stomach of the patient, he advises subcutaneous injections. Emboli in the lung resulted in 4 out of 900 cases, but the condition was only a transient one, and spontaneously disappeared. Dising injects daily 2–8 cc. of a 30 per cent **Iodoform Olive Oil Emulsion**. In six weeks it is stated that all external signs had vanished, and also bacilli out of the nose. Wilkinson reports good results with Röntgen rays.

E. v. Bassewitz² publishes a case in which it was probable that leprosy was conveyed by the parasite of scabies from a leper to his attendant. The incubation period was two and a half years.

REFERENCES.—¹*Arch. f. Schiffs u. Trop. Hyg.* Aug. 1906; ²*Munch. med. Woch.* 1905, No. 41.

LEUCOCYTOSIS. (*See also* BLOOD.)*J. G. Emanuel, B.Sc., M.D., M.R.C.P.*

A New Method of Counting Leucocytes.—Lieut.-Col. Leishman¹ describes a method of enumerating leucocytes by which it is possible to dispense with the use of expensive apparatus, of a special diluting fluid, and of a mechanical stage. Two pipettes are required, one an ordinary 1 cc. pipette graduated to $\frac{1}{100}$ cc.; the other a capillary pipette to deliver five cmm. Both can be purchased at small cost, but the latter can be readily made and calibrated at the laboratory. Five cmm. of the blood to be tested are taken from a finger prick into the capillary pipette and at once diluted 200 times by being blown out into a watch-glass containing 995 cmm. of water, previously measured by the larger pipette. Hæmolysis of the red cells occurs, but the leucocytes are unaffected. The mixture is well stirred and shaken, and by means of the capillary pipette—which has meanwhile been washed and dried in the flame—two successive volumes of 5 cmm. each are taken and discharged side by side in the form of small drops on a clean microscope slide. The drops are allowed to dry and, if desired, the slide may be marked and set aside to be counted at leisure. The specimen is stained by Leishman's stain in the usual way, when the outline of the drop will be clearly defined, while the leucocytes stand out clearly and darkly stained. The whole of the leucocytes in each drop are now counted with the help of a ruled cover-glass prepared by allowing a drop of Leishman's stain to evaporate on the well-polished

surface of the glass ; a thin film is left, insoluble in water or cedar oil, on which a series of parallel lines is ruled with the point of a sharp needle. A drop of cedar oil is now placed on the stained film, and on it is dropped the cover-glass, ruled surface downwards. The thin film of stain does not affect the easy recognition of the leucocytes with a $\frac{3}{8}$ -in. lens, and with the help of the lines the whole of the drop is quickly and systematically searched by reading up one column and down the next ; no mechanical stage is necessary. The cover-glass is then transferred to the adjacent drop, which is counted in the same way. In this manner the whole of the leucocytes in 10 cmm. of the diluted blood are rapidly counted, and the number per cmm. of undiluted blood is at once obtained by multiplying the result by 20. In dealing with leucocythæmic or leucopenic bloods the dilution is readily altered to facilitate counting. As compared with Gowers's hæmocytometer, the readings given by this method appear to underestimate about 5 per cent, which may either be allowed for or neglected.

Artificial Hyperleucocytosis and its use in Infections.—The injection of certain substances, such as normal salt solution, horse serum, and the various antitoxins, produces a greater or less leucocytosis. Certain other substances, amongst which are nucleinic acid and its derivatives, produce a great leucocytosis without any harmful effects. This artificial hyperleucocytosis has been utilized in cases where some form of infection has been expected to occur. Thus, Macdonald² has experimented with sodium nucleinate in cases of street wounds that had become infected before their admission into hospital, and the method was employed with distinct advantage. In the case of a little girl of eleven, in whom the rupture of a volvulus had given rise to a serious infective intra-abdominal condition, the method had seemed to be life-saving. In general, it could be employed wherever bacteria might be expected to find their way to the site of an operation, as after resections of the intestinal canal or in operations about the mouth or the anus, where infection was sure to occur. In Breslau the experience had been that it lessened the mortality. It had been suggested that it might be of use also in puerperal sepsis.

Renner³ gives the results of the prophylactic injection of nucleinic acid in 133 operative cases in Mikulicz's clinic during 1904. Comparing the abdominal sections of this period with those of the preceding years which were not injected, there were 94 cases not injected, with 29 deaths (a mortality of 31 per cent), and 54 cases injected, with 6 deaths (a mortality of 11 per cent), the first set thus giving an almost three times greater death-rate than the injected cases. Renner's conclusions are as follows : (1) Yeast nucleinic acid subcutaneously injected in man produces a definite hyperleucocytosis after a transient hypoleucocytosis ; (2) Its action is as prompt by subcutaneous injection as by peritoneal injection ; (3) Under the use of a 2 per cent solution with a total dose of 1 gram nucleinic acid, the subsidiary reactions are neither harmful nor specially disagreeable ; (4) Though the statistical

basis is small, the results seem to show an increase of resistance to the *Bacillus coli* and apparently also to other organisms.

Digestion Leucocytosis.—Gardall and Noel Paton⁴ have experimented with a view to determining the origin of the cells concerned in digestion leucocytosis. It is well known that after taking food the number of leucocytes circulating in the blood is increased, and reaches a maximum in about four hours. The above observers found that during proteid digestion, blood coming from the marrow constantly contained more leucocytes than either venous, arterial, or capillary blood, and in 6 experiments the average excess was 37 per cent. It is mainly due to polymorphonuclear cells and lymphocytes. Hence they conclude that the bone marrow is probably the sole source, and certainly the only important source, of the leucocytes.

Heiman and Koplik⁵, as a result of a study of leucocyte counts in 50 cases of bronchopneumonia, lobar pneumonia, and empyema in children, show that the diagnostic value of the leucocytosis in the pulmonary affections of children is limited. In certain instances, however, the leucocyte count is of great diagnostic aid. When, for example, in lobar pneumonia, resolution and the drop in the leucocytosis have occurred, and there are present signs exciting suspicion that empyema will be a sequela, then blood-counts should frequently be made at regular intervals. A sharp rise in the count, provided that other causes of leucocytosis can be excluded, is then strong presumptive evidence of a supervening empyema.

F. S. Churchill⁶ has studied the lymphocyte increase in whooping cough and reviews its literature. In 36 cases, leucocytosis existed in all but one. His conclusions are as follows: "(1) A general leucocytosis is present in almost all cases of whooping cough. (2) A lymphocytosis, i.e., an increase in the number of lymphocytes, is found in about 85 per cent of cases at some time during the course of the disease. (3) A lymphocytosis is found even more constantly during the early or catarrhal stage, over 90 per cent showing the phenomenon at this time. (4) A lymphocytosis is found usually in those conditions difficult to distinguish from whooping cough. (5) The presence of a lymphocytosis in a child with a hard, persistent cough is a factor of great diagnostic value. It is also of prophylactic importance, inasmuch as it can be utilized to prevent the spread of the disease by leading to the prompt isolation of the patient. (6) The child's age must be taken into account in estimating the importance of the lymphocyte percentage."

Love⁷ records an extended series of observations on the *Leucocytosis of Typhus Fever*, which he made during the occurrence of a limited epidemic of typhus fever in Glasgow in the autumn of 1902. Details are given of 26 cases, comprising 9 which proved fatal and 17 which recovered. The average leucocytosis of the total number of cases was found to be 24,000 per cmm. In the greater number of the fatal cases leucocytosis was present, though it usually manifested itself in a marked degree only after the appearance of the rash. As a general

rule, in these cases, the leucocytosis increased to a maximum at or just before the crisis, and declined afterwards, if death did not supervene immediately. In none of the fatal cases were eosinophile corpuscles found at any time. The number of red cells in all the fatal cases was higher than is usual in normal blood. In the cases which recovered, there was a gradual increase in the number of leucocytes, from the beginning of the disease onwards, more marked after the appearance of the rash, until the maximum was reached by a rapid rise, either a day or two before, or coincidentally with the crisis. After the crisis a sudden fall occurred, and the leucocytosis gradually declined during convalescence until the normal was reached. With the supervention

DIFFERENTIAL CHART
FOR LEUCOCYTOSIS.

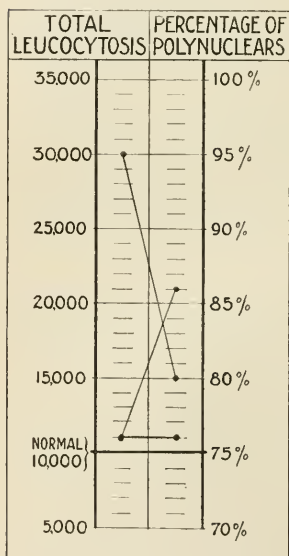


Fig. 41.

of inflammatory phenomena during convalescence, the leucocytosis in some cases exhibited a secondary rise, which, however, never became even approximately as high as the rise which occurred at the crisis. As contrasted with the fatal cases, there was never a complete absence of eosinophile cells in the non-fatal cases.

Charles Langdon Gibson⁸ testifies to the value of a *differential leucocyte count in acute surgical diseases*. He points out that it is the disproportion between the percentage of polynuclear cells and the total leucocytosis that is important. He represents this diagrammatically by means of what he calls a standard chart.

The chart assumes (Fig. 41) that 10,000 leucocytes per cmm. is the upper limit of ordinary normal leucocytosis, and that 75 is the normal percentage of polynuclears. The writer further assumes that in inflammations which are well resisted the polynuclear cells are increased approximately by 1.0 per cent for every

1,000 leucocytes above the normal 10,000 per cmm. Then in the chart the *horizontal* line will indicate a leucocyte count of 11,000, with 76 per cent of polynuclears, whereas the *rising* line represents a leucocytosis of 11,000, but with 86 per cent of polynuclears.

If the line connecting the total leucocytes and the percentage of polynuclears runs fairly *horizontal*, it indicates a lesion, that whether severe or not, is well borne and therefore of good prognosis.

If the line runs *upwards* from the leucocyte to the polynuclear side, it indicates a rather severe lesion and less resistance.

Fatal cases all have a rising line.

A *falling* line (e.g., leucocytosis of 30,000 with 80 per cent of polynuclears, see *Chart*) means a mild lesion—in appendicitis it would

indicate an abscess well shut off, with little febrile or constitutional disturbance.

Gibson's conclusions are as follows :—

1. The differential blood-count and its relation to the total leucocytosis is to-day the most valuable diagnostic and prognostic aid in acute surgical diseases that is furnished by any of the methods of blood examination.

2. It is of value chiefly in indicating fairly consistently the existence of suppuration or gangrene, as evidenced by an increase of the polynuclear cells disproportionately high as compared to the total leucocytosis.

3. The greater the disproportion the surer are the findings, and in extreme disproportions the method has proved itself practically infallible.

4. As the relative disproportion between the leucocytosis and the percentage of polynuclear cells is of so much more value than the findings based on a leucocyte count alone, this latter method should be abandoned in favour of the newer and more reliable procedure.

5. The negative findings, showing no relative increase, or even an actual decrease, of the proportion of the polynuclear cells, while of less value, show with rare exceptions the absence of the severer forms of inflammation.

6. In its practical applications, the method is of more frequent value in the interpretation of the severity of the lesions of appendicitis and their sequelæ.

7. In order to have some standard to measure disproportion of the polynuclear percentage, it is suggested that a trial be made of the chart which is tentatively recommended under the arbitrary designation of "standard."

Rogers⁹ points out the value of blood-counts in differentiating acute hepatitis from amœbic abscess of the liver. The chief interest in the paper lies in the emphasis that the writer lays on a relative leucocytosis, and his method of determining it. This he does, not by a laborious differential count of stained films, but by merely counting the number of red and white corpuscles in the usual manner. In this way he found that in the abscess cases (taking the average of 10 cases) the ratio of the whites to the reds was 1-260, whereas the normal ratio varies between 1-1000 and 1-500. In the cases of acute hepatitis, however (taking the average of 4 cases) the ratio of whites to reds was 1-650. His conclusions are :—

1. Absolute leucocytosis is nearly always found in amœbic abscess of the liver, but in chronic cases with marked anæmia only a relative leucocytosis may be found.

2. The degree of leucocytosis is very variable, being highest in the most acute cases, while a low degree is commonly met with in cases with an insidious onset, in which repeated examinations may be necessary.

3. In acute hepatitis without suppuration, leucocytosis, both absolute

and relative, is nearly always absent. A slight degree may sometimes be met with in the more acute cases, but the symptoms usually yield rapidly to large doses of ipecacuanha if no suppuration is present.

REFERENCES.—¹*Lancet*, Mar. 31, 1906; ²*New York Med. Jour.* Feb. 17, 1906; ³*Scot. Med. and Surg. Jour.* Feb. 1906; ⁴*Jour. of Physiol.* Sept. 1905; ⁵*Arch. Ped.* 1905, p. 734; ⁶*Jour. Amer. Med. Assoc.* May 19, 1906; ⁷*Jour. Path. and Bact.* April, 1905, epit. *Brit. Med. Jour.*; ⁸*Ann. Surg.* April, 1906; ⁹*Brit. Med. Jour.* Nov. 11, 1905.

LEUKÆMIA.

J. G. Emanuel, B.Sc., M.D., M.R.C.P.

Leukanæmia is a term introduced by Parkes Weber to designate cases presenting characters of pernicious anæmia and acute myelogenous leukæmia. The disease is also called *myeloid splenic anæmia*. There is an anæmia of the red cells resembling pernicious anæmia, and changes in the white cells allied to myelogenic leukæmia. The marrow, spleen, and liver are myeloid in character. Hunter¹ records one such case. The red cells numbered 512,000 and the leucocytes 6,000 per cmm. Colour index, 1·5; megaloblasts, 14,000 cmm. Of the leucocytes, 10 per cent were myelocytes. Six weeks later the leucocytes had risen to 290,000 (myelocytes = 40 per cent). Another case is recorded by Bushnell². The red cells numbered 1,120,000 per cmm., leucocytes 11,000 (myelocytes = 8·6 per cent), colour index, 0·7. Hirschfeld is of opinion that leukanæmia and acute myelogenous leukæmia are not separate pathological entities, severe anæmia being commonly a part of acute leukæmia, whether of the myelogenic or lymphatic forms.

Edwin Matthew³ describes four cases of *acute lymphatic leukæmia*, supporting the myelogenous origin of this disease as opposed to the lymphatic origin originally put forward by Ehrlich.

C. H. Melland⁴ describes cases of leucocythæmia showing apparent change from the splenomedullary to the lymphatic form. He recognizes that the lymphocyte cells of acute leucocythæmia are in reality abnormal forms of myelocytes, and not the large lymphocyte cells which occur in normal blood. In this way he explains those cases of *mixed leucocythæmia*—cases apparently of a combination of splenomedullary and lymphatic leukæmia—and also those cases showing "alteration in type," being first splenomedullary and subsequently becoming lymphatic.

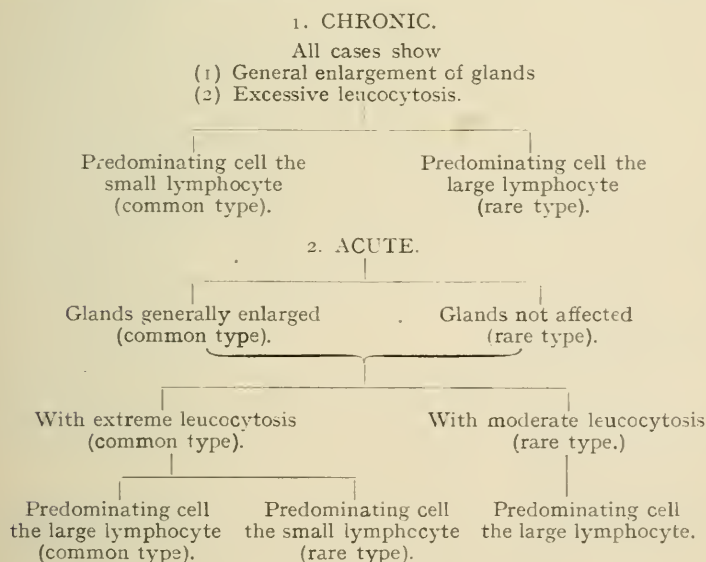
David Edsall⁵ showed that in a case of acute lymphatic leukæmia the loss of nitrogen and of P_2O_5 , i.e., the difference between the amount of N and P_2O_5 in the food and that excreted in the urine and fæces, was enormous. This tissue destruction, though very common in acute lymphatic leukæmia, is not an essential feature. It, and the hæmorrhages so frequent in this form of leukæmia, are probably the result of a common cause, possibly a toxæmia. Edsall also examined cases of chronic lymphatic leukæmia under X-ray treatment, and found that in a case that was successfully treated in this way there was also a remarkable increase in the excretion of N and P_2O_5 , whereas in a case unsuccessfully treated, and in fact shortly afterwards ending

fatally, there was no such increase of metabolic activity. This increased metabolism therefore, apparently has a benign influence on the organism. Normal persons respond to X-ray treatment by such an increase in metabolism. It may be that this tissue destruction is an attempt on the part of an organism to control disease, but that in acute lymphatic leukæmia the process of tissue destruction is carried too far, and possibly death is hastened by the intoxication that results from the products of this rapid tissue destruction.

Myeloid Leukæmia.—Falconer⁶ records 3 cases of myeloid leukæmia. The first is interesting for its association with symptoms resembling Ménière's disease (headache, dizziness, and deafness), and for the occurrence of definitely raised white spots in the retina, which, according to Lazarus, though not infrequent in lymphatic leukæmia has not yet been described in myeloid leukæmia. The second case was in a boy of six years of age—an extremely rare occurrence—only six cases of myeloid leukæmia in children being on record. It presented no features differing from myeloid leukæmia in the adult.

Leukæmia in Children.—T. R. C. Whipham and A. N. Leatham⁷ report two cases of acute lymphatic leukæmia in girls aged respectively two years and one month, and four years and eight months, in which the total white cells never exceeded 25,000 per cmm.

They conveniently express the clinical varieties of lymphatic leukæmia in the following table:—



Priapism and Leukæmia.—Victor Blum⁸ records a case in which priapism constituted the first symptom in a case of leucocythæmia. There are 70 cases on record of priapism being caused by an abnormal

condition of the blood. One post-mortem examination has been made, and revealed thrombosis of the blood cavities in the corpora cavernosa. Another possible explanation of this symptom is, pressure on the erector nerves of the penis or on the prostatic plexus by enlarged glands. Such irritation, however, would cause distension of the corpora cavernosa and of the glans as well, whereas in the case quoted the glans remained soft throughout. Gunske⁹ describes another case in which priapism caused excruciating and almost unbearable pain in a patient suffering from leucocythæmia.

Pernicious Anæmia in Children.—A third case, resembling pernicious anæmia, occurring in a girl of six years, is also recorded in the same paper. Out of 240 cases of pernicious anæmia collected by Ehrlich, only one occurred below the age of ten years.

X-ray Treatment.—J. C. G. Ledingham¹⁰ records extensive hæmatological and chemical observations in a case of splenomedullary leukæmia under X-ray treatment, together with an account of the histology of the hæmopoietic organs after death. He concludes by saying that no satisfactory explanation has yet been given of the enormous improvement in the general condition of the patient under the X rays. It is at least difficult to bring it into line with the blood changes, unless Senn's view is taken, that the rays destroy or inhibit the development of the hypothetical parasite of leukæmia.

Williams¹¹ concludes that the exposure to X rays of patients suffering from myelogenous leukæmia produces a disintegration of proteid material in the leucocytes, the products formed giving rise, in some cases at least, to grave constitutional disturbance. He suggests that when X-ray therapy is being used in this disease the patient should be allowed sufficient time between each exposure to excrete the toxic products which are formed. The daily estimation of the uric acid excreted affords an indication of the length of such intervals, and gives the physician a guide as to the safe dose of X rays to be used.

REFERENCES.—¹*Lancet*, Feb. 17, 1906; ²*Edin. Med. Jour.* April, 1906; ³*Scot. Med. and Surg. Jour.* July, 1906; ⁴*Trans. Path. Soc. Lond.* 1906; ⁵*Amer. Jour. Med. Sci.* Oct. 1905; ⁶*Lancet*, May 12, 1906; ⁷*Ibid.* Aug. 11, 1906; ⁸*Ibid.* June 12, 1906; ⁹*Amer. Med.* Jan. 6, 1906; ¹⁰*Trans. Path. Soc. Lond.* 1906, *Lancet*, Feb. 10, 1906; ¹¹*Lancet*, May 5, 1906.

LEUKÆMIA (Tropical).

J. W. W. Stephens, M.D.

A. Castellani¹ has observed 8 cases of splenomedullary and 3 cases of lymphatic leukæmia in Ceylon in two years. A blood examination will distinguish these cases from tropic splenomegaly (Kala-azar) and chronic malaria.

REFERENCE.—¹*Arch. f. Schiffs u. Trop. Hyg.* Sept. 1906.

LICHEN PLANUS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Radcliffe Crocker¹ maintains that the condition may start in the mouth. He describes the case of a lady in whom he diagnosed the condition by white streaks on her tongue, and who one year later developed it on the body. The analogy between pityriasis rosea,



LICHEN PLANUS.

psoriasis, and this disease is close, in respect that they often have one patch for some time before appearing elsewhere. Its causation is vague. Nerve strain and intestinal toxæmia are of course laid stress on by some writers, and Crocker describes a case where a chill in a football player was followed by the eruption.

The after-pigmentation is often deceptive, and it may be even deeper than in true-syphilitic scars, which it imitates. The first step in treatment is to allay the itching, and for this purpose he finds 3-5 gr. of **Thymol** in 1 oz. of olive oil, rubbed in with pressure rather than friction, to be very effective. Internally, **Salicin** is generally the best medicine, but if widespread he uses 5 gr. of **Quinine** made into an effervescent mixture by dissolving with **Citric Acid** and adding it to a solution of **Bicarbonate of Potash**. Arsenic is disappointing. **Biniiodide of Mercury** is useful in some cases, and where the general health is broken down by overwork he advises **Mineral Acids** and **Nux Vomica**. He omits to mention **X Rays**, which we and others have found to succeed when other means fail. *Plate VII*, taken from one of Dr. Cranston Low's casts, is an excellent illustration of the chronic form of lichen, which, though little amenable to other treatment, generally yields to the X rays.

REFERENCE.—¹*Clin. Jour.* June 20, 1906.

LIGATION OF VEINS.

Priestley Leech, M.D., F.R.C.S.

In many cases the surgeon is in doubt as to what veins he may ligature with impunity, and Prof. Goldmann¹ remarks that it is curious modern surgeons should have paid so little attention to research bearing on collateral circulation of veins. The great advance in renal surgery has brought the vena cava and the question of its ligation into greater prominence. Anatomical, physiological, and pathological facts, as well as the results obtained by ligation of the vena cava in the human subject, all prove that ligation is a legitimate procedure, provided the ligature is placed below the influx of the renal veins. It is an important fact, first recorded by Israel, that clinical symptoms may be absolutely absent in cases where the vena cava is involved or even obstructed by a diseased kidney. Simultaneous ligation of both common jugular veins remains without untoward consequences. Goldmann has tied the innominate vein without any circulatory trouble ensuing; and in one case, where, in excising a gland which had invaded the bulb of the jugular vein, the hæmorrhage was stopped only after tying the common jugular, the subclavian, and innominate veins, not the slightest circulatory trouble ensued. It is a fact known to pathologists that even simultaneous thrombosis of the superior and inferior vena cava may leave the circulation unimpaired.

REFERENCE.—¹*Lancet*, Jan. 13, 1906, p. 81.

LIPOMA (Tropical).

J. W. W. Stephens, M.D.

There is a peculiar form of *symmetrical* lipoma of the dorsum of each hand, described by M. Martin¹ as occurring in negroes in Togo. The tumours lie generally between the middle of the third

metacarpal bone and the wrist, and are about the size of a plum split longitudinally. They generally interfere with the movement of the joint, and the patients desire their removal. Occasionally they give rise to severe results.

REFERENCE.—¹*Münch. med. Woch.* May, 1906.

LIPOMATA (Retroperitoneal).

A. W. Mayo Robson, F.R.C.S.

Retroperitoneal lipomata are tumours which usually attain a very large size before the attention of the surgeon is called to them. They are often of obscure origin, though the majority probably arise from the perirenal fat. They are so rare that it seldom happens that any surgeon sees more than one, and it is probably for this reason that no definite technical principles for their removal have been evolved and recognized. Adami in 1897 collected 42 cases of retroperitoneal lipoma in the literature, and classified them according to origin, making three classes, viz.: (1) Those definitely perirenal; (2) Those of doubtful origin; and (3) Those arising from the mesenteric fat. The most recent comprehensive article on this subject which we have been able to find was published by Johnson in 1904. He considered 24 of Adami's cases to be of perirenal origin, and thought that probably many of the doubtful cases also belonged in this class, so that it may perhaps be considered that rather more than 50 per cent of retroperitoneal lipomata arise from the perirenal fat. He was able in 1904 to collect only 46 cases in the literature, and at that time reported two more of his own, which, with the case reported here, brings the total up to 49. (Since this was written, Ahren, of Quebec, has reported a case, making a total of fifty). That these growths are essentially benign is shown by the fact that in only three of these cases has sarcomatous degeneration been found, and that the growth has recurred after removal in only one case. They must, therefore, be considered as distinct from retroperitoneal sarcomata, which may, however, present a very similar clinical picture.

The symptoms connected with these growths are chiefly conspicuous by their absence. Usually the first symptom is a feeling of weight in the abdomen, with some gastric irritability. As the tumour grows, the symptoms are those of pressure, such as alternate constipation and diarrhoea accompanied by vomiting, dyspnoea, oedema and ascites from venous obstruction, and occasionally neuralgic pains in the legs from pressure on the lumbar plexus. But it is extraordinary how often only trifling symptoms are present, even when the tumour has reached a very large size.

The diagnosis is made by the lack of mobility, the smooth rounded surface, and the semi-fluctuant sensation imparted by the fat, aided occasionally by the stripe of tympany in the middle of the flatness over the rest of the tumour which is made by the overlying colon when that is distended; but the diagnosis has been very infrequently made, the tumour being most often mistaken for an ovarian cyst. Other mistaken diagnoses have been those of mesenteric and retroperitoneal

cysts, echinococcus cyst of the liver, hydronephrosis, and even ascites. Edward Reynolds and Richard G. Wadsworth¹ contribute the report of a case, and describe the details of the operation, especially with a reference to the anatomy of the fasciæ of the perirenal space. They conclude their article by stating that although this operation was successful, and although they believe it was conducted along the lines which should lead to a high percentage of success, the method adopted was reached purely by instinct from the necessities of the situation,

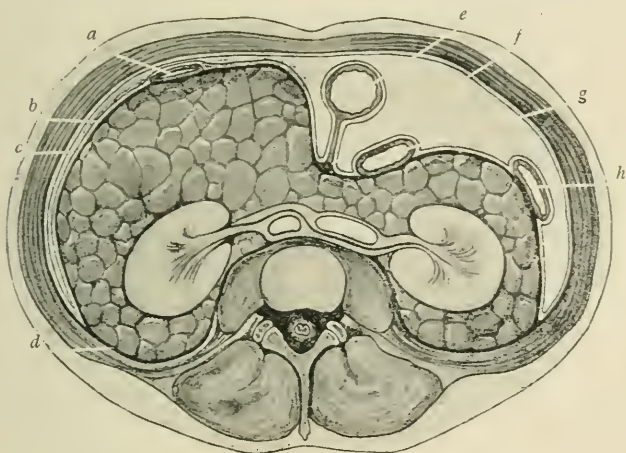


Fig. 42.—Semi-diagrammatic cross-section through the tumour at the level of the renal vessels, seen from above. The prerenal and retrorenal fasciæ unite to form the transversalis fascia. The whole intestinal tract lies in front of the prerenal fascia. *a*, Descending colon; *b*, Prerenal fascia; *c*, Peritoneum; *d*, Retrorenal fascia; *e*, Small intestine; *f*, Superior mesenteric artery; *g*, Duodenum; *h*, Ascending colon.

and the dissection throughout was attended by the greatest anxiety to the operator, but the comprehension of the conditions which they have gained by the anatomical studies upon which this paper is based has made them feel that the attack upon a second case of this nature would be comparatively easy and safe.

REFERENCE.—¹*Ann. Surg.* July, 1906.

LIVER (Surgery of).

A. W. Mayo Robson, F.R.C.S.

Suture after Resection.—It is well known to surgeons who operate on the liver, that difficulties frequently attend the application of sutures, seeing that the organ is so soft and friable. In order to overcome this difficulty, various suggestions have been made. Personally, I have found that a moderately thick catgut applied by means of round needles has usually answered if the ligatures were not drawn so tight as to cut through, and only occasionally have I used the elastic suture.

Payr and Martina¹ have suggested the use of plates of metallic

magnesium, of which one is placed on each side of the wound and sutures passed through the holes and drawn fairly tight. It is best when possible to excise the tissue after passing the sutures, but if the tissue to be removed is wedge-shaped, the sutures must pass through the cut surface, and therefore cannot be applied until later. The sutures are tightened until only a few arteries still bleed, and these are tied separately. If the plates are drawn too tight there is danger of necrosis, and pieces of tissue escaping into the circulation may cause pneumonia. The magnesium decomposes the blood, with the immediate formation of fibrin, and is oxidized by the water into MgO_2 with evolution of hydrogen gas, which is rapidly absorbed and does no harm. A very dull needle should be used, and catgut sutures of about the same diameter, to avoid bleeding from the puncture. Experiments showed the entire trustworthiness of the method for sutures of the liver and spleen.

Le Cholépéritoiné Hydatique.—Beaudet² has contributed an interesting communication under the above heading, based on 47 collected cases dependent on the rupture of a hydatid of the liver into the peritoneum. Clinically, the affection is characterized by an effusion into the general peritoneal cavity appearing in an acute abdominal seizure due to rupture of the cyst, which as a rule is at the commencement not accompanied by jaundice. The effusion may absorb spontaneously, but usually it increases and is associated with fever. Sooner or later paracentesis is performed, when a deeply bile-stained fluid is found containing echinococcic débris. The effusion speedily returns, and the tendency is towards rapid cachexia and death. The only rational treatment consists in laparotomy, which has four aims: (1) The evacuation of the bile-stained fluid and drainage of the peritoneal cavity; (2) The removal of the hydatid elements diffused into the peritoneal cavity; (3) The free opening and evacuation of the cavity in the liver that originally contained the hydatid cyst; (4) The exploration of the biliary passages if they have been obstructed by hydatid débris. Beaudet dwells on the importance of such patients, after recovery being under supervision, in order that a secondary echinococcus that may have escaped should be attended to without delay. It is also important to bear in mind that every diagnosed hydatid cyst ought to be operated on without delay in order to avoid such complications. (See also HYDATID DISEASE).

REFERENCES.—¹*Arch. f. klin. Chir.* Bd. 67, Hft. 4, 1905; ²*Thèse de Paris*, 1906, *Gaz. d. Hôp.* Aug. 7, 1906.

LUPUS ERYTHEMATOSUS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Smith¹, in an examination of 56 cases, found the mucous membrane affected in 16 cases, the greater number occurring in the disseminated type. The characters of these lesions in the mucous membrane are the following: Reddish violet coloured, ill-defined spots, slightly infiltrated, and occasionally having small superficial ulcerations; later the

cicatricial streaks run out to the violet border, and finally the redness becomes effaced, and the resulting lesion is marble-white, hard, and with striæ converging to the centre. The patches on the tongue are depapillated, red, and without infiltration, painless, and situated on the edges of that organ.

Gaucher² considers that the treatment *par excellence* for the skin lesions is the application of **Chemical Caustics**. He first scarifies, and then applies a mixture of equal parts of tincture of iodine and glacial acetic acid. The acid attacks the layers speedily and prepares them for the action of the iodine, which is the essential element. Whatever may be the explanation, he gets good results.

REFERENCES.—¹*Brit. Jour. Derm.* Feb. 1906; ²*Jour. Mal. Cut. et Syph.* April, 1906.

LUPUS VULGARIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Von Veress¹, using as his text the outbreak of multiple lesions following a case of varicella, advances the heterodox opinion that these multiple nodules are due to external inoculation. He instances the absence of metastasis in internal organs, the absence of generalized emboli, the appearance after and not during the acute exanthemata, and the frequent increase in the eruption at a later period. Histologically also there are no signs of implication of the vessels.

Gaucher² treats small patches with the **Thermo** or **Galvanic Cautery**, but he regards larger areas as more suitable for treatment by **Chemical Caustics**. For some years he has used the following:—

R Absolute Phenol 20 grams | Ethylic Alcohol (95%) 5 grams

Crusts must be previously removed by moist dressings, and the patches must be quite dry before the above remedy is applied. He swabs it on with wool every second day, and on the intervening days dresses with carbolic wool (1-6).

REFERENCES.—¹*Monats. f. Prakt. Dermat.* Bd. x.; ²*Jour. Mal. Cut. et Syph.* April, 1906.

LYMPHATIC GLANDS (Progressive Enlargement of).

(See HODGKIN'S DISEASE.)

MALARIA.

J. W. W. Stephens, M.D.

The brothers Sergent¹ have found sporozoites in *A. algeriensis* and *Myzomyia hispaniola*, so that these two anophelines must be added to the list of malaria-carriers. The same observers², in a study of malaria in Algeria, give some very interesting and important facts.

Seasonal Variation.—Malaria, as determined by a spleen index, is about twice as prevalent in the rainy season (August to January) as it is in the dry season (January to August). As determined by the endemic index (i.e., the percentage of infected children), it is four times as numerous.

Segregation.—The advantage of this means of prophylaxis is shown by the following example: Two farms are both near an anopheline

marsh: one has native huts around, the other not nearer than a mile and a quarter: the first is "malarial," the second is quite free from malaria.

Water Plants.—While it is well known that species of *Lemna* prevent larvæ from breeding, *Ceratophyllum demersum* favours them.

Flight of Anophelines.—The maximum flight is less than a mile.

Duration of Life.—Where all breeding grounds in certain localities have been dry for six months, anophelines have been caught in the huts, and similar observations extend the period to nine months.

Anophelines that transmit Malaria.—Sporozoits have been found in *A. maculipennis* (2–5 per cent), *A. algeriensis*, *P. myzomyiæ*.

PROPHYLAXIS.—**Quinine** is the best method of prophylaxis among natives; the taste is entirely masked by suspending in olive oil.

Antilarval measures.—Drainage must be accompanied by weeding and oiling of small collections of water.

E. A. O. Travers and M. Watson³ state that the marked improvement in the health of the inhabitants of Klang and Port Swettenham in consequence of the anti-malarial measures adopted, is still maintained (1905). It should be noted, moreover, that the decrease in the number of deaths from "other diseases" is nearly as great as those from "fever;" to what this is due is not apparent.

Mangin⁴ records the finding in Jamaica of *Stegomyia fasciata* and the following anophelines: *A. punctipennis*, *Arribalzagia maculipes*, *Cellia argyrotarsis*, *Ce. albipes*, and *Cyclolepidopteron grabhamii*.

Mosquito Bars.—Fisch⁵ subjected various materials used for making mosquito-proof buildings to the test of exposure to the salt-laden sea-breezes on the Gold Coast. Iron, brass, and copper gauze (mesh $2\frac{1}{2}$ mm.) were so corroded at the end of six months as to be practically useless, or in such a condition that they would soon have become so. Nickel gauze or perforated nickel sheeting was practically unchanged; also celluloid, and a paper-like, almost incombustible, fibrous material were quite unchanged. For some purposes the two latter may be useful, but on the whole nickel is the best material. Though the most expensive, it will be far cheaper in the end.

Quinine Prophylaxis.—Morgenroth⁶ states that the quinine prophylaxis carried out amongst the German troops in South West Africa was attended with striking success. Among 15,000 men, the maximum number of cases was only 126. Some individuals suffered from malaria in spite of the strictest prophylaxis, but their attacks were very slight, and there was little or no tendency to relapse. The method followed was the taking of 1 gram (15 gr.) every Thursday and Friday evening. In exceptional cases, from various unpleasant results, the dose was somewhat modified.

A. Celli⁷ argues that his mode of prophylaxis is more effective and practical than that of Koch or Plehn. These methods are as follows:—(1) Celli's method: Daily, two sugar-coated tabloids of bisulphate or hydrochloride 3 gr. each. (2) Plehn's method of "double prophylaxis": $\frac{1}{2}$ gram every fourth or fifth, or fifth and sixth

day. (3) Koch's method of "long interval prophylaxis." 1 or $1\frac{1}{2}$ gram on two consecutive days at intervals of eight to ten days. Celli says that the physician should determine whether more or less than two 3-gr. tabloids should be given, according to circumstances. e.g., the condition of the patient and the severity of the malaria in a district.

C. F. Craig⁵, from a study of the action of **Quinine** on malarial parasites in fresh and stained specimens, concludes that it exerts an injurious influence during all stages of their human life cycle, except just prior to sporulation, at which time the sporulating body is not injured and sporulation occurs, but most of the spores are destroyed by the drug while they are free in the blood-plasma. He advocates, as a result of this study, the administration of quinine in divided doses at regular intervals of time, rather than the giving of one or more large doses. Quinine has no effect upon the morphology of crescents.

Euquinine⁹ is particularly indicated in the presence of gastric or intestinal catarrh, or where there exists quinine idiosyncrasy. Generally 15 gr. per diem suffice. **Methylene Blue**¹⁰ has been used successfully by Noguera in cases of malaria where quinine and arsenic have failed. 8-15 grains per diem were used.

Thiocol in 2-gram doses was tried by Nocht¹¹ in 14 cases of malaria with no good result whatever, thus contradicting Polidoro, who had attributed to this drug remarkable results. Nocht considers that the discrepancy can be explained by supposing that Polidoro's cases were old chronic cases, in which the parasites disappear spontaneously from time to time under any treatment. Nocht advises, in the treatment of malaria, five doses of 3 gr. daily.

Gentipicrin, a glucoside from *Gentiana lutea*, according to G. Tauredt¹², kills malaria parasites. The dose is 1.5-2 grams. An infusion of the roots is used by the natives in Corsica as a remedy against fever.

Diesing¹³, from his observation of the use by natives of sulphur vapour baths, and from his own experience, recommends **Sulphur Warm Baths** in cases of chronic malaria. C. R. Carpenter¹⁴ strongly advocates the use of **Splenic Extract**. He gives it in 5-gr. doses in a powder enclosed in capsules.

H. M. Smith¹⁵ describes a new form of parasite in pernicious cases occurring in the Philippine islands. They are highly refractive spindles, $\frac{1}{3}$ - $\frac{2}{5}$ the diameter of the red cell in length, and having in their centre a dot of hæmoglobin. The figures accompanying the text appear exactly like the clefts in red cells that may be seen in normal blood. Further, the author says the bodies stain with great difficulty, and he is unable to demonstrate a nucleus. These facts would lead one to doubt very strongly the parasitic nature of these bodies.

Thiroux¹⁶ supports the view of the unity of the malaria parasite as held by Laveran. From an examination of native children in Senegal, he found that in the hot weather the tropical forms amounted

to 98.5, and large forms (tertian and quartan) to 1.5 per cent, whereas in November and December the respective figures were 73.5 and 26.4, in March and April they were 64.1 and 35.8. He considers that it is difficult to admit the existence of a summer and winter malaria due to absolutely different species.

*Blackwater Fever*¹⁷.—Among 60 cases of blackwater admitted into the Hamburg Tropical School, attacks of hæmoglobinuria were seen in 40 in hospital. Parasites were found in 75 per cent of these latter. In all there was malaria previously. In all cases the attack was induced by drugs: once by methylene blue, once by antipyrin, and in all the rest by quinine. The most important matter in the after-treatment of patients is accustoming them to quinine. The best results were got with centigram ($1\frac{1}{2}$ gr.) doses, but occasionally smaller doses must be used. It is absolutely necessary that the medical man should supervise this cure and watch for the slightest indication of a rise of temperature, jaundice, or pain in the liver. The cure is not complete until 15 gr. can be taken without ill effect. Mense recommends flushing the kidneys by means of large quantities of warm tea, and states that vomiting is not nearly so marked if the tea be sucked through a tube instead of swallowing in the ordinary way.

Hintze¹⁸ records that blackwater fever is exceedingly rare in the Straits Settlements. Among 2694 cases of malaria, only two cases of blackwater were seen, one at Penang and one at Singapore. Probably, though it is not stated, an extremely large portion of these cases were amongst natives: Malays, Chinese, Tamils, etc. In the Federated Malay States, blackwater fever is only exceptionally observed.

H. Vincent¹⁹ believes that in malarial patients a variety of causes, among them cold, acute alcoholism, quinine, and antipyrin can produce hæmoglobinuria. This susceptibility the author believes can be prevented by **Calcium Chloride**, and its action makes itself felt even during the attack; 4 to 6 grams are given daily, or 1 to 2 grams are injected subcutaneously in physiological serum.

Dammermann²⁰ uses in the treatment of this malady, especially where the attacks have been due to quinine, a native African fever remedy, viz., a decoction of the leaves of **Combretus Raimbanthus**. To induce diuresis, the author administers milk and **Potassium Acetate**, 2 per cent solution, a teaspoonful every 1 or 2 hours. Malaria patients in whom quinine is likely to induce blackwater, the author treats with decoct. fol. combreti 24, water 1500, as a tea during the day.

F. W. G. Masterman²¹ calls attention to the fact that blackwater fever is not uncommon in Southern Palestine, especially in the neighbourhood of Jaffa, e.g., in the German colony of Sarona, in the Jewish colony of Mulebbas, and also at Rishon-le-Zion. Cases have also occurred at Jerusalem. All these places are distinctly malarious.

The brothers Sergent²² state that it is certainly less rare in Algeria than is generally believed. In 1904 they record 20 cases with 15 deaths in 1905, 11 cases with 7 deaths.

REFERENCES.—¹*Comptes Rend. de la Soc. de Biol.* Nov. 1905; ²*Ann. de*

l'Inst. Past. April, 1906; ³*Jour. Trop. Med.* July, 1906; ⁴*Jour. R.A.M.C.* 1906, p. 423; ⁵*Arch. f. Schiffs u. Trop. Hyg.* Mar. 1906; ⁶*Ibid.*; ⁷*Ibid.* Jan. 1906; ⁸*Amer. Med.* April, May, 1906; ⁹*E. Merck's Ann. Rep.* vol. xix. 1905; ¹⁰*Ibid.*; ¹¹*Arch. f. Schiffs u. Trop. Hyg.* Mar. 1906; ¹²*Bull. Gén. de Thév.* Nov. 1905; ¹³*Arch. f. Schiffs u. Trop. Hyg.* Aug. 1906; ¹⁴*Med. Rec.* Aug. 1906; ¹⁵*Amer. Med.* Oct. 1905; ¹⁶*Ann. de l'Inst. Past.* Sept. 1906; ¹⁷*Arch. f. Schiffs u. Trop. Hyg.* Jan. 1906; ¹⁸*Ibid.* Sept. 1906; ¹⁹*Comptes Rend. de la Soc. de Biol.* Dec. 1905; ²⁰*Deut. med. Woch.* 1906, No. 23; ²¹*Brit. Med. Jour.* Feb. 1906; ²²*Ann. de l'Inst. Past.* April, 1906.

MALTA FEVER.

J. W. W. Stephens, M.D.

Distribution.—According to C. Birt¹, Malta fever is endemic in the Orange River Colony; it should be noted that goats' milk is largely used in the district. Ross² attributes the existence of Malta fever at Port Said to the existence there of *Acartomyia zammitii*, a culicid the larva of which can only exist in concentrated sea-water. An outbreak of Malta fever on board ship is recorded in the same journal, where it is probable that the infection arose from drinking the milk of goats shipped at Malta. Lamb and Pais³ have isolated the micrococcus from the spleen of patients suffering from fever in the Punjab; and Forster⁴ found that goats also in this part of India were infected. D. Bruce⁵ sums up the results of the Commission investigating the disease in Malta.

Epidemiology.—An examination of 525 dock-hands at Malta showed that 15 per cent gave the serum reaction, and consequently were cases of ambulatory Malta fever; 9 out of 22 examined were found to be excreting the cocci in their urine. It is thought that on the whole about 2 per cent of the native population excrete cocci in the urine, and so are a source of possible danger. In addition to goats, mules and dogs in Malta are infected. About half the goats in Malta are infected, and about 10 per cent are excreting the urine in their milk.

Incubation Period.—This is still in some respects uncertain, but it probably ranges from 6 to 30 days, according to the mode of infection.

Case Mortality.—This is about 13 per cent in the army at Malta, and about 9 per cent among the civilian population.

Mode of Escape from the Body.—The main channel is by the urine. The coccus is excreted from about the fifteenth day of the disease until after convalescence is established.

With regard to the *characters* of the coccus and its *mode of isolation*, we repeat here what was said in last year's *Annual*. The medium should be acid (+ 10 Eyre's scale, i.e., 10 cc. of $\frac{1}{1}$ NaHo are required to exactly neutralize a litre of the medium). The coccus does not ferment glucose, renders milk alkaline without coagulation, and is agglutinated by a highly diluted specific serum.

Mode of Infection.—The following facts point to goats' milk as being the chief source of infection: (1) Monkeys can be infected by feeding on goats' milk; (2) The ship outbreak mentioned above; (3) The existence of Malta fever in the Punjab, and the existence of micrococci in the milk of goats there; (4) The occurrence of Malta fever in

Rhodesia, said to have followed the introduction of goats; (5) The occurrence of fever among children who consumed unboiled milk was found by Davies to be four times as great as that among children drinking boiled milk. Another mode of infection is probably by the absorption of the urine of infected patients. With regard to the transmission by mosquitoes, there are a few successful results on record, but it is possible that infection arose from some unrecognized source, and the question at present must still remain open.

Agglutination by Goats' Milk (Zammit's Test).—To 10 cc. of the milk 1 drop of 40 per cent of formalin (? formaldehyde) is added to prevent the milk turning sour. Equal parts of milk and an emulsion of *M. melitensis* are then placed on a slide in a moist chamber for 12 hours. Examine now the clear edges of the drop with a $\frac{1}{8}$ -inch lens for clumping. This reaction is reported to be a surer test of cocci being excreted in the milk than the serum reaction of the same goat.

Pasteurization of Milk.—Heating to 68° C. for ten minutes is sufficient to destroy the cocci.

Distribution of the Coccus in the Body.—The cocci are found most frequently in the spleen, liver, and lymphatic glands, and next in the kidney.

Opsonic Index.—"Washed leucocytes" are necessary for determining this factor. (Equal parts of blood and 1 per cent sodium citrate are drawn up into a pipette with a chamber about 2 inches long. Draw up into the bulb, break the stem off short, and seal. Centrifugalize. Draw off the supernatant fluid with another fine pipette, then add excess of normal saline solution, and mix. Centrifugalize. Again draw off the fluid, add more salt solution, and centrifugalize again. The upper layer of the sediment consists largely of "washed leucocytes"). Make the following mixtures:—

Washed leucocytes of a healthy person (A)	2 parts
Serum of a healthy person (B)	2 parts
Emulsion of <i>M. melitensis</i> , heated to 100° C. for one hour	3 parts
Sodium Chloride 3 parts	} 1 part
Sodium Citrate 4 parts	
Water 100 parts	

Mix and incubate at 37° C. for fifteen minutes; make a smear on slide, and without fixing, stain with weak watery gentian violet. Count the number of cocci (x) in, say, fifty leucocytes (y), then $\frac{x}{y}$ = the control unit. Now make a similar mixture, but instead of serum *B* above use that of a Malta fever patient. Determine the ratio $\frac{x'}{y'}$. Then $\frac{y'}{x'} \times \frac{y}{x}$ = opsonic index. The opsonic index is definitely lowered in Malta fever.

Phagocytic Index.—Mix equal parts of blood, and emulsion of *M. melitensis* prepared as before, in a capillary pipette. Incubate at 37° for 15 minutes. Compare the result as regards number of cocci absorbed with that of a control blood. The phagocytic index is definitely lowered. (This process is far more rapidly and easily

performed than the determination of the opsonic index, and may to a certain extent be used instead).

L. Phillips⁶ records several cases of Malta fever from Egypt; and C. Nicolle⁷ finds that it exists in Tunis.

REFERENCES.—¹*Jour. R.A.M.C.*, Jan. 1906; ²*Ibid.* 1906, p. 33; ³*Ibid.* 1906, pp. 133, 165; ⁴*Lancet*, Feb. 17, 1906; ⁵*Jour. R.A.M.C.* 1906, p. 330; ⁶*Lancet*, Feb. 10, 1906; ⁷*Arch. f. Schiffs u. Trop. Hyg.* 1905, Bd. ix.

MAMMARY GLAND.

H. Batty Shaw, M.D., F.R.C.P.

The interesting problem has been raised by S. G. Shattock¹ whether, in antithesis to the positive findings of Professor E. H. Starling² that injection of extracts of foetal rabbits into virgin rabbits caused enlargement of the mammae in the latter animals, extract of the enlarging mammae of pregnant rabbits could influence the growth of the foetus. A series of guinea-pigs were deprived of their mammae, and in three cases the wounds healed completely and the animals were healthy. Subsequently one became pregnant and bore three young ones, two of which were full sized. Shattock was convinced that one of these full-sized young ones, which was artificially fed and kept alive six days, had not suffered by the ablation of the parental mammae, and that therefore these glands "during pregnancy did not furnish any internal secretion which was necessary for the growth of the foetus."

REFERENCES.—¹*Lancet*, Aug. 26, 1905; ²*Ibid.* Dec. 28, 1905, and *Trans. Path. Soc. Lond.* 1905, p. 150.

MARASMUS (Infantile).

Prof. G. F. Still, M.D.

It is perhaps open to doubt whether marasmus should ever be described as a disease. Certainly experience tends to narrow more and more the conception of marasmus as anything more than a symptom of chronic digestive disorder of some kind, if indeed it be not due to some more obvious disease, such as syphilis. But Continental writers especially, have written of it as if it were a disease, and recently Variot¹ has even gone so far as to subdivide it into three forms, according to the course of the disease, viz., *infantile atrophy*, where the arrest of nutrition is temporary and can be so far overcome that the infant eventually thrives; *athrepsia*, where the marasmus is progressive and incurable; *bradytrophy*, where the emaciation is prolonged to a much later date, perhaps until the third year. Even if marasmus could be regarded as a disease in itself, it is difficult to see what useful purpose such an entirely arbitrary classification could serve. He maintains also that if an infant is so wasted that it weighs less than half the normal between three and eight months of age, it is incurable by the use of sterilized milk. This one may well believe, but common experience shows that infants considerably under this limit of weight often, perhaps even usually, recover, if carefully fed with some food adapted to their feeble powers of assimilation.

On the other hand, the view that infantile marasmus is always a secondary result of gastro-intestinal disorder, owing to destructive changes in the mucous membrane of the intestine, has been disproved

by various observers. Wentworth² quotes observations by Bloch, who found no atrophy of the mucosa when formalin had been injected into the peritoneal cavity just after death to prevent post-mortem changes. The theory that marasmus is due in some cases, if not in all, to a chronic intestinal intoxication, is also unproved. Czerny suggested that excess of cow's milk proteid might cause an acid intoxication, and it has been shown that excess of fat in the food tends the same way, but in both cases probably the acid is not accumulated sufficiently to do any harm. Heubner has shown that the fæces of marasmic infants contain much proteid and fat, and as Wentworth says, it seems probable that functional rather than organic impairment of assimilation is the chief factor in infantile marasmus.

TREATMENT.—Wentworth discusses three modes of treatment :

1. Proprietary foods, which in the majority of cases, he says, are unsuitable, and vary so much in their results that no definite rules can be laid down as to their use.

2. Cow's milk, which, however modified, often fails completely ; in successful cases it is usually a mixture containing a low percentage of fat and proteid which succeeds. Carbohydrate must be somewhat high, to compensate for the poorness of the mixture in other respects. The amount of each feed should be smaller than is normal for the age, and the intervals should be shorter. It would seem that a marasmic infant can utilize more proteid than a healthy infant, but in doing so it uses up much energy, and therefore Heubner considers that excess of proteid in the diet is actually harmful to the marasmic infant ; certainly these infants do well with an extremely small proportion of proteid.

3. Human milk, when obtainable, is by far the best solution of the problem how to feed the marasmic infant ; but if the mother's milk is lacking, the difficulty of obtaining a wet-nurse, and the risks of syphilis and tuberculosis, as Handfield-Jones³ points out, all make feeding by foster-mother a serious consideration.

Sutherland⁴ considers that on the whole the most satisfactory method of feeding the marasmic infant is with **Peptonized Milk**, and that if progress is made with full predigestion the peptonizing period should be reduced to the shortest time possible. For example, if there is gain in weight with milk peptonized for half an hour, the period should soon be reduced to fifteen or ten minutes, or even less, in fact to the lowest time which is efficient. In this way the stomach is educated into doing its proper work. In these marasmic infants, some of the patent foods, in which starch has been converted, are also occasionally successful, partly because they mechanically assist the digestion of the milk, and partly because they add certain food elements which the disordered stomach can retain and digest. To these remarks Sutherland adds some important rules : (1) That in chronic illness no "infants' food" should be continued longer than is absolutely necessary. (2) If the infant is apparently thriving well on the food, it will in all probability actually thrive better on a fresh-milk diet. (3) In all cases where a predigested or preserved food has been used for more

than two weeks, orange or grape juice ($\frac{1}{2}$ oz.) in water should be given daily to avoid the risk of scurvy. (3) Under similar circumstances the addition of fresh cream or cod-liver oil to the diet should be made as soon as possible, because the fatty element is usually deficient in all "infants' foods" (as prepared for use) and is specially essential.

The value of **Raw Meat Juice** in cases of marasmus has been emphasized by Mallick⁵, who thinks that digestion is impaired by a low proportion of nitrogenous constituents in the food, and recommends raw meat juice as being most easily tolerated and giving better results than egg-albumen. After raw meat juice has been given for a time, **Egg-albumen** may be substituted, as it is then digested, and is cheaper and more simple to obtain than the meat juice. Fat, he says, should be added cautiously, and only after the power of digestion seems to be re-established; **Yolk of Egg** may be useful for this purpose, as it contains a high percentage of fat. **Massage** seems to assist assimilation in some cases, and Mallick points out that fresh air seems to cause a remarkable improvement of nutrition in some infants.

In cases where marasmus is progressive in spite of all the usual methods of feeding, Langford Symes⁶ advises the administration of **Alcoholic Dextrins** in the form of XXX Dublin stout, which, with subsequent addition of proteids and fat, will often save life. One ounce of double stout is equivalent in alcoholic value approximately to 1 drachm of brandy; and on this basis Symes considers that half an ounce of stout every four hours can be given safely to a marasmic infant. He generally orders Guinness' XXX stout $\frac{1}{2}$ oz., hot water $\frac{1}{2}$ oz., cream $\frac{1}{2}$ –1 dr., fresh beef juice 2–3 dr., with some sugar, every four hours. No vomiting, hiccough, flatulence or diarrhoea was observed to result, nor did the mixture intoxicate the child or make him drowsy. After a time, extract of malt is substituted for the stout, and the child gradually resumes milk-feeds. Symes suggests that where alcohol is contra-indicated, trial might be made of **Hop-wort**, which is unfermented stout; it is a thick, sweet, brown liquid, containing all the ingredients of stout, except that sugar replaces the alcohol.

Buttermilk is recommended by Stoos⁷ especially for cases in which there is marasmus without diarrhoea. Its composition is proteid 2·5–2·7 per cent, fat ·5–1 per cent, sugar 3–3·5 per cent. But Stoos, like other Continental supporters of buttermilk, does not use it plain, but converts it into a starchy food by adding to each litre of buttermilk a level tablespoonful of fine rice or wheat flour, and boiling for about twenty-five minutes, and to the mixture thus obtained he adds 2–3 heaped tablespoonfuls of sugar. He quotes cases in which excellent results were obtained with this feeding.

A recent method of treatment to which infants have been subjected by Mace and Quinton is the subcutaneous injection of **Sea-Water**. About 180 min. were injected into the subcutaneous tissue of the back every second day in premature and very small infants: in larger infants, weighing 8–12 lbs., three times this quantity (i.e. about 9 dr.) of sea-water was injected. Apart from a rapid gain in weight which followed

this treatment, the authors consider that the disappearance of jaundice, the cessation of diarrhœa, and recovery from bronchitis were all attributable more or less to the injections of sea-water. Perhaps the most impressive outcome of their experiments is the proof that the infantile constitution can tolerate a good deal.

Rothschild⁸ has obtained good results with **Van Swieten's Liquor** (a solution of 1 part of mercuric chloride in 900 parts of water and 100 parts of alcohol). The cases in which he used it were not syphilitic, so that the good results could not be attributed to any antisymphilitic effect. He thinks it is probable that the mercury exercises some alterative action upon the glands connected with the alimentary canal, especially upon the liver. Under its use vomiting ceased, the stools became more yellow and free from curds, and less offensive, and abdominal distension disappeared; but the chief criterion of its value in any particular case is the rise in weight. The dose to be used is small, and varies according to the age from 10 to 20 drops per diem: it should not be continued indefinitely—about a fortnight is sufficient—but if there is any relapse it may be repeated for another course of a fortnight.

REFERENCES.—¹*Gaz. d. Hôp.* 1905, p. 27; ²*Jour. Amer. Med. Assoc.* Aug. 25, 1905; ³*Pract.* Oct. 1905; ⁴*Clin. Jour.* Nov. 22, 1905; ⁵*Calcutta Med. Jour.* Sept. 1906, p. 79; ⁶*Brit. Jour. Child. Dis.* July, 1906, p. 290; ⁷*Pediatr.* Mar. 1906, p. 191; ⁸*Trans. Internat. Congr.* 1906.

MASTITIS (Treatment by Passive Congestion). (See INFLAMMATIONS.)

MASTOID OPERATION. (See EAR.)

MEASLES.

E. W. Goodall, M.D.

ETIOLOGY.—R. C. Rosenberger¹, of Philadelphia, states that in the fresh serum obtained from blistering the skin during the eruptive stage of measles, he has observed with the oil immersion lens, in 39 out of 41 cases, "a more or less constant hyaline body, possessing the following characteristics. In size it varied from $\frac{1}{10}$ to $\frac{1}{8}$ of the diameter of a red blood-cell. It was generally spheroid, but ovoid or pyriform forms were also seen. It was, as stated before, perfectly hyaline, and possessed, or had attached to it, a round or irregular oval-shaped granule of a brownish-black colour, which was actively motile. This granule travelled round the entire periphery of the body in a most deliberate manner, stopping every now and then, and appearing to try to gain an entrance into the body. . . . In two or three instances flagella were seen, but never more than two. In the same specimen of fluid another hyaline body, also motile, but containing two to four small motile granules, was occasionally seen." Attempts to cultivate the body were made, but without success. Serum from normal persons, a few cases of scarlet fever, and a number of syphilitics, did not contain this body.

Ludvig Hektoen² appears to have demonstrated that the infection of measles is contained in the blood of a patient suffering from that

disease. He obtained 4 cc. of blood from the veins of two patients in the eruptive stage, the strictest aseptic precautions being taken. Tubes of peptone-broth were inoculated with this blood, and incubated at the body temperature for twenty-four hours. They remained sterile, as did subcultures on a variety of media. At the end of the twenty-four hours' incubation, 4 cc. of the mixture of the blood and peptone-broth were injected beneath the skin of two men who submitted to the experiment voluntarily. Neither had had measles nor had been recently exposed to the infection. In the one case there was, on thirteenth day after the injection, a rise of temperature, which continued for five days. On the third day a measly rash came out on the forehead, and spread to the face, neck, and chest. In the other case, pyrexia began on the eleventh day after injection, on the twelfth there was conjunctivitis, on the thirteenth a cough, and on the fourteenth a morbilliform rash. [I have not seen the original account of these experiments. In the account given in *The Hospital* nothing is said as to the presence in these two men of Koplik's spots. It might be objected that the mere injection of blood gave rise to the pyrexia and rash.—E. W. G.]

The value of the so-called "Koplik's spots" in the diagnosis of measles is again emphasized by H. Bruening³, of Leipzig. They were found to be present in 50 cases of measles out of 52 which were examined. In 3 instances they were seen in six days, in 3 five days, in 4 four days, in 7 three days, in 11 two days, and in 25 one day before the appearance of the rash. In most cases they disappeared before the rash came out. Bruening was unable to find them in many cases of German measles, scarlet fever, and serum eruptions.

REFERENCES.—¹*Amer. Med.* June, 1906; ²*Jour. Inf. Dis.*, Chicago, Mar. 1905, quoted in *Hosp.* Dec. 16, 1905; ³*Deut. med. Woch. Bd.* xxxi. No. 10, p. 384, quoted in *Amer. Jour. Med. Sci.* Jan. 1906.

MELANOMA. (See NÆVUS.)

MENINGITIS (Epidemic Cerebrospinal).

Purves Stewart, M.D.

Continued observations of this disease by many observers have established the fact that the causal organism—the *Diplococcus intracellularis*, which is constantly present in the cerebrospinal fluid—occurs with great frequency in the nasal discharges. In more than half the cases of meningitis in which the nasal discharges were examined by Goodwin¹ from the cases of Drs. Park and Bolduan, of New York, the meningococcus was present in the nasal cavity. More than this, Vansteenberghe and Grysez² found the same organism in the nasal fossæ of healthy men, and cultures of the organism injected into the meninges of rabbits or guinea-pigs produced the typical lesions of cerebrospinal meningitis. It would appear that the common channel of infection in man is probably through the nose, and that the disease in epidemics is communicated from one patient to another by the nasal discharges. In every case of cerebrospinal meningitis, then, it is

advisable to carefully disinfect the nasal passages of the patient, and of all who are brought in contact with him—not only his family, but the physician and the nurse.

REFERENCES. — ¹*Med. Rec.* Nov. 11, 1905; ²*Ann. de l' Inst. Past.* ref. in *Brit. Med. Jour. Epit.* June 16, 1906.

E. W. Goodall, M.D.

This disease has been somewhat prevalent in Glasgow of late, and Dr. W. Wright¹, the Assistant Medical Officer of Health, has given a short account of the rashes that have been met with. They are commonly hæmorrhagic, consisting of purpuric spots, from a mere point up to the size of a lentil; these spots are often arrayed in clusters. In two cases the dorsa of the feet were the only parts affected; in others the clusters were scattered irregularly all over the skin. In one case there were several large blue blotches, and the purpuric spots came out in crops from day to day: the blotches came out late. In all these cases of purpuric rash death took place. Sometimes herpes about the mouth occurred.

Dr. Chalmers², Medical Officer of Health for Glasgow, states that in one case the rash closely resembled that of typhoid fever on some portions of the skin.

REFERENCES.—¹*Lancet*, Sept. 15, 1906, p. 717; ²*Ibid.* July 7, 1906, p. 47

MENINGITIS (Tuberculous).

Priestley Leech, M.D., F.R.C.S.

Prof. Roberto Alessandri¹ reviews, in a long and interesting paper, the results and prognosis of surgical intervention in tubercle of the brain and its meninges. He comes to the conclusion that it can only be considered in a small number of cases, even when it is a matter of limited tuberculous lesions of the brain, owing to the ordinary site of the tubercles, the frequent complication with meningitis, their multiplicity, and the presence of serious tuberculous lesions of other organs of the body. Intervention is excluded if a diagnosis of tubercle or its probable presence cannot be made. In his statistics he has only included cases in which tubercle was found on operation and removed. In all he has collected 22 cases of operation for the cerebrum and 6 for the cerebellum. In the former the result of operation was favourable in 19. It must be added, however, that in some of these cases the amelioration was very little or none at all; in others the good result has lasted for some time. The statistics of tuberculosis of the cerebellum are more discouraging. Of 6 cases where a lesion was found and removed, death immediately followed in 4, and in the other two only a transitory amelioration took place. The paper contains a good many references to the work on this subject, and there is a good bibliography at the end.

REFERENCE.—¹*Ann. Surg.* Feb. 1906.

MIGRAINE. (See REFRACTION, ERRORS OF.)



MOLLUSCUM CONTAGIOSUM.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The etiology of this condition is very obscure. Many have maintained that they have found the organism, but no one discovery has held its own against criticism; hence Juliusberg's experiments on the filtration of the contents of a molluscum body are very interesting. He expressed the contents from a tumour, treated it with bouillon, and filtered through a Chamberland filter. Three persons were subsequently treated, the arms being rubbed with glass-paper till slight bleeding occurred, and then the filtrate rubbed in. Fifty days later a molluscum body appeared in one case; the others failed.

We mentioned in last year's *Annual* our success by means of **X Rays**. Since then we have steadily used this remedy, and find it specially useful and uniformly successful where the lesions are numerous and closely set together, as round the anus. *Plate VIII*, which is from a cast by Dr. Cranston Low, gives an excellent presentment of the disease. All traces disappeared in three weeks under the rays.

REFERENCE.—*Deut. med. Woch.* Oct. 5, 1905.

MUMPS.

E. W. Goodall, M.D.

An epidemic of this disease occurring at Rugby School gave Clement Dukes' an excellent opportunity of studying the incubation period. The school reassembled on January 18th. In a certain boarding-house, in which there were 57 boys, one boy arrived at 7.30 p.m. He retired to bed at 9.45 in a dormitory with nine other boys. On the morning of January 19th he was found to be suffering from mumps, and promptly removed to the sanatorium. He was associated with many boys from 7.30 p.m. to 9.45 p.m., and with nine from 9.45 p.m. to 7.30 a.m. This boy directly infected 23 others. In 5 cases the incubation period, dating from January 18th, was sixteen days; in 8 cases, seventeen days; in 6 cases, eighteen days; in 3 cases, nineteen days; and in one case, twenty-three days. The outbreak was of a severe type; 9 of the 23 cases mentioned had orchitis, which set in from the third to the tenth day; and in 7 of these it arose on the seventh or eighth day. Dukes states that "though every boy was kept in bed for eight clear days (never even putting foot to the floor for any purpose) more cases of orchitis occurred than I have ever witnessed when such care is observed." There were in all 66 cases in the outbreak.

REFERENCE.—*Lancet*, Mar. 24, 1906, p. 861.

MYCOSIS FUNGOIDES.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The treatment of this condition by **X Rays**, first recorded by Jamieson, is now firmly established, and many successful results have been recorded. Markley¹ reports a case in a woman of forty-nine, with tumour formation which had lasted four years. Taylor² reports another, where exposures every fortnight resulted, like the above, in a complete cure.

On the other hand it is well to note that in some cases it seems only to arrest the local outbreak, as it occasionally does in malignant disease, the disease then attacking the internal organs. Jackson³ mentions a case that had lasted for five years, in which the local lesions disappeared under X rays, as also did the intense itching, but in which hyperpigmentation of the skin, and excessive scaling, tending to exfoliative dermatitis, supervened. Eventually the woman died with chronic enteritis.

C. J. White and F. S. Burns⁴ succeeded also in removing the tumours by X rays, but their patient died with toxic symptoms.

REFERENCES.—*Jour. Cutan. Dis.* Jan. 1906; ²*Lancet*, Mar. 24, 1906; ³*Med. Rec.* Feb. 24, 1906; ⁴*Ibid.*

MYOPIA. (See REFRACTION, ERRORS OF.)

NÆVUS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The histology of this new formation is a constant battleground for various workers. Wilfred Fox¹ has written a lengthy paper on the subject, and in it points out that nævi often occur over spots, such as clefts, where deformities are common; and that though "numerous moles do not fit in with any of the above anatomical positions, yet I think that the clinical evidence, so far as it goes, points in favour of the epidermal origin of the so-called nævus cells." Histologically a nævus is "not a passive inclusion of epidermal cells in the corium, but shares rather an active process among certain cells of the prickle layer which separate themselves off from their fellows, grow downwards, and rupture through the basal layer of the epidermis, forming a mass in the upper part of the corium." From seventeen specimens he deduces the following: (1) That in those moles which show the typical columns of nævus cells, the cells are epidermal in origin; (2) That there is a rarer variety of soft mole which shows no typical nævus cell arrangement, and whose origin is uncertain and possibly mesoblastic; (3) That the majority of cases of nævo-melanoma are nævo-carcinoma; (4) That melanomata do arise in the skin entirely apart from moles; (5) That Cohnheim's view of the origin of malignant growths is not borne out by the foregoing observations on the histology of nævo-melanoma; (6) That the pigment appears to be closely connected with the prime cause by reason of which moles become malignant, whatever that cause may be.

J. C. Johnston², from 29 cases examined, concludes that nævus cells have a lymphatic endothelial origin, and that the factors in malignant evolution are: (1) The existence of cells approximating to an embryonic type, and (2) Irritation. The commonest melanomata of the skin are derived, first, from soft nævi, and are lymphatic endotheliomata; the next commonest do not arise from nævi, but are also lymphatic endotheliomata; and a last type occurs truly epithelial in origin.

Adamson³, discussing the pathology of linear nævi, says they consist of hyperkeratosis and thickening of the prickle layer, and in the same

sections he observed absence of small cell exudation and a thickened nerve and blood-vessel. This last fact is interesting in connection with the nerve origin which is maintained by some workers.

TREATMENT.—Dreuw⁴ recommends energetic **Cauterization** by concentrated **Hydrochloric Acid**. A crust forms which falls off in two to three weeks, and then a reddish area is left which whitens in four to six months. If small dilated vessels are observed afterwards, he destroys them by Unna's "microbrenner." The part is frozen with ethyl chloride before applying the acid.

REFERENCES.—¹*Brit. Jour. Derm.* Jan. and Mar. 1906; ²*Jour. Cutan. Dis.* Jan. and Feb. 1905; ³*Brit. Jour. Derm.* July, 1906; ⁴*Monats. f. Prakt. Derm.* Bd. xl. No. 10.

NEPHRITIS. (See also ALBUMINURIA, FUNCTIONAL).

Prof. J. Rose Bradford, D.Sc., M.D.

Acute Nephritis.—Gullan¹ considers that the indications for treatment in acute nephritis are: (1) To secure rest for the inflamed organ, and thereby decrease the risk of an increase of the inflammation; (2) To counteract the dangers which result from the interference of the excretory action of the kidney by encouraging other organs, especially the skin and bowels, to act freely; and (3) To relieve the hyperæmia of the kidneys if possible. The diet in acute cases should be limited, in the case of an adult, to 50 ounces of **Milk** in the twenty-four hours, and the return to the normal diet should be very gradual, and effected by adding first a little carbohydrate, such as milk pudding, then bread and butter, and then fish. Gullan considers that relapses are often induced by adding to a milk diet, and he records a case where the urine had been free from blood for nine days, but it reappeared on the tenth owing to an increase in diet. Animal broths, beef tea, and chicken broth should certainly not be given in acute nephritis. To carry out the second indication for treatment, recourse must be had to **Purgatives**, and hydragogue purgatives are the most efficient. Gullan orders **Magnesium or Sodium Sulphate** 3-4 dr. in an ounce of water. He considers that, as regards diaphoretics, tincture of **Jaborandi** in $\frac{1}{2}$ -1 dr. doses and the liquid extract of jaborandi 5-10 min. are the most useful, and **Sodium Bonzoate** 10-20 gr. is also strongly recommended as a mild diaphoretic and diuretic, and as a disinfectant of the urinary tubules. **Hot-air Baths** and the **Warm Pack** are also useful, and may be combined with the administration of **Pilocarpine** $\frac{1}{10}$ gr. hypodermically. Gullan and other observers have pointed out the disadvantage of the use of this drug, especially in cases of uræmia, owing to its action on the glands of the bronchial mucous membrane, and it should certainly not be given when lung complications are present. Gullan considers that digitalin and other stimulating diaphoretics should not be given during an attack of acute nephritis unless cardiac failure is present, as their use is often followed by hyperæmia. To relieve the hyperæmia of the kidneys he recommends **Dry-cupping**. He regards morphia and opium as contra-indicated in all cases of acute nephritis, but that **Hyoscine**

Hydrobromide may be used with safety in cases where there is much headache, restlessness, or sleeplessness.

Carter², while agreeing generally with Gullan's conclusions, considers that **Morphia** might be used under certain circumstances even in acute renal disease, and especially in those cases where the uræmic symptoms are associated with dilatation of the pupil. In such cases a hypodermic injection of a quarter of a grain may be very beneficial. He is further of opinion that the administration of oxygen is of benefit in the treatment of uræmia. Carter also advocates, in cases of total suppression, a hypodermic injection of 2-3 gr. of **Caffeine** dissolved in a solution of **Salicylate of Soda**; 1 dr. of salicylate solution dissolves 20 gr. of caffeine, and the administration of 2-3 gr. of caffeine is followed by the passage first of all of blood-stained urine, and then a copious diuretic effect is produced.

Necrosis of Renal Cortex.—Hewitt³ has observed several cases of necrosis of the cortex of the kidney, and has collected literature on the subject. Orth mentions necrosis of the tubules as a result of anæmia dependent on various causes, such as thrombosis, amyloid degeneration, and hydronephrosis, and further that it occurs in diabetes, gout, icterus, poisoning with cantharidin, chlorates, chromates, and petroleum, and finally that necrosis may follow such infective diseases as pyæmia, typhoid fever, diphtheria, acute tuberculosis, etc.

Necrosis limited to a few cells of the renal tubules may also occur in most forms of acute and chronic nephritis. Very extensive necrosis has also been observed as a result of poisoning with corrosive sublimate and oxalic acid, and Ebstein has stated that general necrosis of the epithelium of the convoluted tubules may occur in diabetes associated with cirrhosis of the liver. Three cases have been recorded in which necrosis so extensive as to involve the entire cortex of both kidneys has occurred in association with pregnancy. In all three complete anuria resulted.

Hewitt records ten cases of various diseases, such as jaundice, acute yellow atrophy of the liver, carcinoma of the stomach, suppurative tonsillitis, pleurisy and pericarditis, chronic alcoholism, and pelvic abscess, in which necrosis of the epithelium of the convoluted tubules occurred in varying degrees. In all these cases the necrosis was apparently dependent on some infection, and the bacteriological report showed most usually the presence of *Streptococcus*, and sometimes *Bacillus coli* in addition. Hewitt considers that the necrosis is dependent on the action of a poison circulating in the blood-stream which is so potent that it quickly destroys all the highly specialized epithelial cells, and that the destruction is so rapid that no reaction takes place. He points out that the injury to the kidney is very similar to the necrosis of the liver which is described under the name of acute yellow atrophy, and of his ten cases five showed lesions similar to those of acute yellow atrophy in the liver. Nevertheless, just as in acute yellow atrophy there is not always complete necrosis of the renal epithelium, so in cases of necrosis of the cortex of the kidney the liver may escape.

The renal lesions in these cases develop very much more rapidly and completely than is the case when nephritis is produced. The urine may be perfectly normal to within a few days of death, and then complete suppression may occur. Complete suppression is only seen in instances where the necrosis is extensive, and it is important to recognize that the complete anuria is not accompanied by the violent symptoms seen where suppression ensues in the course of acute nephritis. The clinical picture presented by these cases of anuria associated with complete necrosis of the renal cortex is quite similar to that seen in cases of calculous obstruction; in other words, notwithstanding the complete arrest of the urinary flow the patient presents no marked symptoms beyond progressive weakness and perhaps occasional vomiting, and death may occur quite suddenly at a time when the patient is still conscious. In some of the cases recorded by Hewitt, where the renal lesion was not so complete, and where other lesions such as acute yellow atrophy of the liver were present, marked symptoms were frequently present, such as coma and delirium. In the puerperal cases, however, where the lesion in all the three cases was complete, the symptoms were those of calculous obstruction.

Bacilluria.—The *Bacillus coli communis* varies greatly in its virulence, and the resistance of the normal individual to infection from this organism is profoundly influenced by the state of the general nutrition. The organism obtained from healthy intestines has but a slight degree of virulence, but this is much increased where disease of the intestines exists. The *Bacillus coli* has been isolated in pure cultures in the most diverse lesions of different organs, and it is also answerable for a number of infections of the urinary tract.

Clarence Williams⁴ thinks that bacilluria due to colon bacilli may arise in one of two ways. In the first or so-called ectogenous variety, the infection is derived from external causes, and thus the urinary lesions have a prostatic or vesical origin and are dependent either on bladder injections or the use of catheters, sounds, etc. This infection may be either bilateral or unilateral, and the lesion is an ascending one. In the second or endogenous variety the bacilli are derived from some internal lesion, and they pass into the urine from the blood, or else in some cases by direct migration of the organism from some neighbouring viscus to the urinary tract. McWilliams quotes a statement of Rostoki that 80 per cent of all infections of the urinary tract are due to colon bacilli, and in a large number of instances the primary source of the infection is enteritis, and it would seem that in some instances the bacilli may pass perhaps directly from the rectum to the prostate and thus reach the bladder. It is possible that this infection is brought about via the lymphatics. When the lesion has once become implanted in the prostate or bladder, extension may take place to the kidneys, and Bond has shown that particles may ascend various mucous passages in a reverse direction to that followed by fluid normally excreted. Thus it is possible that organisms may pass up

normal ureters notwithstanding that the flow of urine is a descending one.

When the infection of the urinary tract takes place through the blood the kidneys are first involved, but the kidneys may also be primarily affected by direct extension of some inflammatory focus such as an appendix abscess. McWilliams considers it is probable that even in constipation colon bacilli may be excreted through the urine, and certainly in cases of infected wounds a sufficient number of organisms enter the circulation to cause infection of the kidneys, if these for some reason are vulnerable. Colon bacilli are not only frequently found in cases of cystitis, but also in cases of pyelonephritis. The urine undergoes little change as regards the distribution of the nitrogen in urea, ammonia, and non-urea compounds, and it retains its normal reaction to litmus. Although acid, the urine acquires a characteristic pungent odour which is sometimes almost faecal, and shows a thick viscous deposit. The urine is not only acid in the cystitis due to colon bacilli, but also in that caused by tubercle and typhoid, and sometimes by the gonococcus. The ordinary pyogenic organisms always cause an alkaline cystitis. In pyelitis unaccompanied by cystitis the urine is almost always acid. In many cases of bacilluria the only symptom present is a slight frequency of micturition, but the urine may be loaded with bacilli. This condition may go on for weeks or months and ultimately disappear, or it may produce pyelonephritis, etc.

The most important point in determining the treatment is to ascertain whether cystitis is present alone or whether pyelonephritis exists as well. The author considers that in cystitis the urine is always purulent throughout, whereas when the pus is derived from the kidney it sinks to the bottom of the glass and forms a compact layer, while the deposit of pus when derived from the bladder does not sink entirely to the bottom but remains more or less suspended in the fluid. When cystitis and pyelitis exist together the following test may be used to distinguish them. The patient should pass water into two glasses, and then the bladder should be irrigated with hot boric acid solution until the fluid returns clear. One hour later the urine is drawn off with a catheter, and if it is then as purulent as that derived before the washing out, the pus probably comes from the kidney. In pyelonephritis the urine not only contains pus, bacteria, and albumin, but renal casts and epithelial casts are present, and there may be deficient excretion of the ordinary solids, and on examination the kidneys may be found enlarged and tender. Further, the relation between the albuminuria and the pyuria is often a valuable means of distinguishing between a renal and a vesical lesion.

In the treatment of urinary infections the essential thing is to try to make the urine as aseptic as possible. For this purpose **Urotropin** still remains the most efficient agent. McWilliams considers that larger quantities are necessary than those usually prescribed, but large doses are apt to produce vesical irritation, and they have been reputed to cause hæmaturia and even renal colic. Urotropin seems to act best in

acute infections, and is of far less value in chronic cases. McWilliams considers it is best to administer the drug in small doses at first, such as 5 gr. for four or six hours, and then to increase it as rapidly as possible to as much as 15 gr. every four hours. He recommends that the total amount to be given in 24 hours should be dissolved in a quart of water, and the patient allowed to sip this. If the urine be alkaline it should be rendered acid by giving acid sodium phosphate, benzoate of sodium, boracic or benzoic acid. On the other hand, if the urine is acid he thinks it best to make it alkaline by administering **Bicarbonate of Sodium** or **Citrate, Acetate, or Bitartrate of Potash**. The reason for this treatment is that the urea-decomposing organisms have their growth hindered by an excess of acid, while the micro-organisms which cause the increased acidity of the urine are inhibited by an alkaline condition of the urine. Further, it is useless to treat chronic or recurring infections of the urinary tract caused by the *Bacillus coli* unless the accompanying enterocolitis, constipation, etc., are also treated with a **Milk Diet, Intestinal Antiseptics, or Irrigation of the Colon**.

*The Significance of Casts in the Urine*⁵.—Cylindruria is defined as the presence of casts in the urine, and it is spoken of as pure if no albumin is present as tested by the ordinary clinical methods. Epithelial casts are made up of cells with round nuclei, and are derived from the tubules below the loops of Henle. Hyaline casts frequently have one or more cells with round nuclei attached; many of these cells have clear protoplasm, though the kidney cells are granular. True epithelial casts occur in acute nephritis; hyaline casts are much more common, and are frequently found in athletes and after hard exercise. Blood casts not only occur in hæmorrhagic nephritis, but may also be found in association with hyaline casts after very hard exercise. True pus casts occur in purulent nephritis; but Emerson states that hyaline casts with pus cells attached may also be found in athletes. Coarsely granular casts are opaque, with very coarse granules, and are to be looked upon as pus or epithelial casts that have degenerated. The true hyaline cast is faint and watery, is only seen by shutting off the light, and may be found in any condition where albuminuria is present. Emerson regards the waxy casts as modified granular casts, and records that in some cases of chronic passive congestion with the clinical diagnosis of nephritis there were all varieties of casts, although there was no anatomical evidence of the presence of nephritis. He considers that it is impossible to distinguish acute nephritis from exacerbations of chronic nephritis by the examination of the urine alone; the clinical history of the patient must be obtained. He recognized two forms of chronic interstitial nephritis, the white kidneys and the red kidneys, the latter due chiefly to arteriosclerosis, and he considers that in the red kidney a trace of albumin may often remain at a time when the casts have disappeared and that, on the other hand, in the white variety the albuminuria often clears up first.

Pure cylindruria occurs much more often than is generally supposed if the urine is examined fresh and centrifugalized. A slight circulatory

disturbance of the kidneys, or even manipulation, such as bimanual palpation, may cause the appearance of casts. Further, it is important to realize that cases of chronic nephritis with small white kidney may have casts in the urine but no albumin. Pure cylindruria may also follow the use of drugs, as, for example, sodium salicylate, alcohol, or mercury, and it is also frequently seen in the course of acute diseases, such as erysipelas, scarlet fever, tonsillitis, diphtheria. A large number of casts may occur at the onset of diabetic coma, sometimes without albuminuria; these casts are mainly hyaline or finely granular. He considers that the greatest number of casts are seen in cases where the kidneys are but slightly diseased, and further, that epithelial, blood, and pus casts have not as much significance as has sometimes been attached to them.

REFERENCES.—¹*Brit. Med. Jour.* Aug. 18, 1906; ²*Lancet*, Feb. 24, 1906; ³*Johns Hop. Hosp. Bull.* Aug. 1906; ⁴*Med. Rec.* July 7, 1906; ⁵Emerson, *Johns Hop. Hosp. Bull.* Jan. 1906.

E. Hurry Fenwick, F.R.C.S.

The treatment of nephritis by **Decapsulation** of the kidney is not receiving much support. Guiteras¹ collected 120 cases two and a half years ago, with a death-rate of 33 per cent. Interstitial nephritis gave some brilliant results, albumin and casts disappearing from the urine, but the death-rate was 26 per cent. Recently Guiteras has collected cases from the same sources, but could only obtain 40 cases, of which 1 recovered, 3 were improved, 3 were unimproved, and 33 died. He decides against the operation, and does not see how it can improve the condition of the kidney.

With regard to the condition of the kidneys after the operation, Herscheimer and Hall² gave their experience from the results of operations on rabbits. They found that a new capsule, thicker than the old, rapidly forms, and there is no sign of marked collateral circulation. In cases where nephritis had been produced by the administration of ammonium chromate, the operation did not influence the nephritis either favourably or unfavourably. Steinberg³, on the other hand, found some increase in the collateral circulation in cases of experiments on dogs.

Peabody⁴ reports a case of a boy operated upon four times, each time with relief of anasarca, and who is probably going to have a fifth operation.

Opposed to the more pessimistic views, Harris⁵ believes that benefit can be derived from the operation if the cardiovascular system is not markedly affected. He quotes a case of chronic parenchymatous nephritis very fully, in which decapsulation of both kidneys was performed, with apparent relief, but energetic medical treatment was carried out after the operation, and the abdomen had to be subsequently tapped four times.

Graham⁶ reports 11 cases with 5 deaths following the operation in children. He believes all would have died if not operated upon. Four cases he thinks may be considered as probable cures. The

varieties of disease most benefited are the acute and subacute, the results from chronic cases not being good. He thinks that the good effect is due to the relief of the renal tension, and as a new capsule is rapidly formed, the final results are doubtful. He believes the prognosis to be better in children than in adults.

REFERENCES.—¹*Med. Rec.* Feb. 10, 1906; ²*Virchow's Archives*, 1905, clxxix. p. 153; ³*Mitteil. a. d. Grenzgeb.* 1903, vol. xii.; ⁴*Med. Rec.* Feb. 10, 1906; ⁵*Johns Hop. Hosp. Bull.* Dec. 1906; ⁶*Arch. Ped.* quoted in *Brit. Med. Jour.* Dec. 1905.

NERVE GRAFTING. (See PARALYSIS.)

NEURALGIA.

Purves Stewart, M.D.

There are certain varieties of neuralgia in which we can apply our treatment directly towards the removal of the cause. Thus, for example, in the neuralgias due to malaria, to diabetes, or to anæmia, our chief endeavours are directed to the treatment of the underlying cause. But there are many cases where we must content ourselves with a purely symptomatic treatment. This is especially the case in trigeminal and in sciatic neuralgia, in cases where there is no local exciting cause to be discovered in the territory either of the trigeminal or of the sciatic nerve. Where the various analgesic drugs have failed, we are justified in attacking the nerve locally. Various substances have been employed by **Local Injection** into the nerve-trunk or its neighbourhood, of which the most important are water, saline solution, alcohol, carbolic acid, and osmic acid. Of these, osmic acid and alcohol tend to produce permanent degeneration of the nerve-fibres, a condition which is sometimes desirable (as in inveterate trigeminal neuralgia; but, in the case of mixed nerves such as the sciatic, may produce a degree of permanent motor weakness in the muscles supplied by the nerve.

Schlösser's¹ method of treating trigeminal neuralgia by deep **Injections** of 80 per cent **Alcohol** into the main divisions of the fifth nerve at their emergence from the base of the skull, has been practised also by Ostwalt², who has recorded encouraging results. In Schlösser's method a specially long needle is used. It is pushed through the mucous membrane of the mouth behind the last upper wisdom tooth: then, crossing along the outer surface of the external pterygoid plate to the lower surface of the great wing of the sphenoid, the alcohol is injected directly into the foramen ovale, through which the third division of the trigeminal emerges. To reach the second division of the nerve in the foramen rotundum, the needle is withdrawn along the outer surface of the external pterygoid plate; on reaching the anterior edge of this, the needle is now turned upwards and inwards for half an inch until it enters the foramen rotundum, where the alcohol is again injected. The first division of the nerve, at its emergence through the sphenoidal fissure, is reached by withdrawing from the foramen rotundum, crossing a narrow bridge of bone, and redirecting the needle into the sphenoidal fissure. Thus, by a single puncture,

all three divisions of the fifth nerve can be injected with alcohol at their emergence from the base of the skull. Ostwalt adds cocaine or stovaine to the alcohol, but Schlösser gets equally good results from alcohol alone. As a rule, the pain disappears for four to six months, when another application may be necessary. This method of treatment requires considerable manual dexterity to ensure finding the various foramina at such a depth, but it is worth bearing in mind as a possible substitute for the major operation of nerve-excision, or the still more serious excision of the Gasserian ganglion, to which we are sometimes obliged to resort.

Apart from attacking the nerve-trunks themselves, good results have also been obtained by the **Subcutaneous Injection** of fluids in the position of the "tender points," especially in cases of sciatic neuralgia. Originally introduced by Schleich and Lange, this treatment has been recently recommended by Krause³, Launois⁴, Rüdiger⁵, and others. It consists in the injection of a fairly large quantity of sterile fluid, 5 cc. or more, under the skin at the points of maximum pain. For this purpose a convenient solution is one which contains 0.5 per cent of sodium chloride and 1 per cent of sodium sulphate in distilled water. To this a small amount of stovaine or of eucaïne may be added, but both Rüdiger and Krause consider that the effect is mainly mechanical, due to separation of the nerve-endings by the fluid. Adrenalin may be added to the solution to produce a degree of local anæmia.

Priestley Leech, M.D., F.R.C.S.

SURGICAL TREATMENT.—Jordan Lloyd⁶ classifies facial neuralgias under four headings: (1) Those due to abnormal blood conditions, e.g., gout, anæmia, syphilis; (2) Those due to neuritis, as in herpes and tabes; (3) Those due to some local cause, such as carious teeth, eye defects, sinusitis, and the pressure of growths; (4) Those which are truly epileptiform with no ascertainable cause. Operation is only justifiable in the last. The chief features of this epileptiform variety are as follows:⁶ It is almost invariably unilateral, commencing in the distribution of the second or third division of the fifth nerve, and tends to involve both to the same extent. The attacks of pain are paroxysmal or spasmodic, tending to increase in severity, with lessened intervals of rest. As a rule they are accompanied by spasm of the neck muscles on the affected side, without ascertainable cause, although individual paroxysms may be brought on by talking, eating, or exposure of the skin to slight cold or light pressure. It attacks by preference male adults between the ages of thirty and fifty. It slowly increases in severity, spontaneous cure being almost unknown. It is not influenced by medical treatment, but may be temporarily relieved by peripheral operations, and is cured only by partial or complete removal of the Gasserian ganglion. The intervals of complete relief between the paroxysms differentiate this form of suffering from neuralgia, and point strongly against the theory of neuritis as the cause of the suffering. Hutchinson lays down the following simple rules for

operation. If the neuralgia be limited to the infra-orbital branches, resection of the nerve, by following back the branches in the infra-orbital canal, may be tried. If it concerns the several branches of the inferior maxillary division (the inferior dental and the auriculo-temporal intracranial), resection of the trunk and adjacent parts of the Gasserian ganglion is indicated. For all other cases, the ganglion should be resected. Lloyd has operated in eleven cases without a death. All were cured without relapse. Six years is the longest period he has had a patient under observation. Lloyd describes his technique with an osteoplastic resection of an omega-shaped flap.

REFERENCES.—¹*Berl. klin. Woch.* Jan. 15, 1906; ²*Lancet*, June 9, 1906; ³*Allg. med. Zeits.* April 21, 1906; ⁴*Med. Press*, May 9, 1906; ⁵*Med. Klin.* 1906, No. 10; ⁶*Birm. Med. Rev.* Jan. and Feb. 1906, reported in *Ther. Gaz.* July 15, 1906.

NOSE. (Deflections of Septum.)

P. Watson Williams, M.D.

Operative Treatment by Submucous Resection.—In early life, at any rate before the age of puberty, nasal obstruction is, in the large majority of patients, caused by adenoid growths, in greater or less degree; and nasal stenosis in adults is usually due either to turbinal hypertrophy or to deflections, spurs, or general thickening of the septum nasi, and not seldom to these several conditions in association. But even in quite young children a considerable number of adenoid operations are performed with disappointing results, because the essential or associating cause of buccal respiration is due to these intranasal conditions being overlooked and left unrelieved.

Operations on the nasal septum were so often unsatisfactory in their results, that until the method of submucous excision was practised it was often better to confine interference with the septum to narrow ridges and spurs, and, whenever possible, to seek to overcome the difficulty by partial removal of the turbinated bodies.

Briefly, the submucous operation consists in the removal of the obstructing and deviating portions of the cartilaginous and bony septum, while completely preserving the mucous membrane, and overcoming the resistance of the deflected cartilage, thus replacing the thick or distorted septum by one that is straight, thin, and stiff. All other methods involve the destruction of some mucous membrane, with a risk of scabbing or crusting, or of leaving a ridge, or at least the cartilage, which, if thickened, interferes more or less with the patency of the nasal passages.

The essential points in the operation are as follows:—

ANÆSTHESIA.—One advantage of the submucous method is that it can often be done under local anæsthesia, but although my earlier cases were performed with local anæsthetics, and many operators habitually rely on them, it is rather a severe test to most patients, and therefore I usually prefer a general anæsthetic (gas and ether, followed by chloroform), although it makes the operation a little more difficult to perform.

If local anæsthesia is to be employed, the nasal passages should be

sprayed with a $\frac{1}{1000}$ solution of adrenalin chloride, containing 10 per cent of cocaine hydrochlorate. After a few minutes, strips of gauze soaked in the same solution may be applied to the septum on either side, care being taken to make them lie in contact with the upper and posterior parts of the septum, as well as the more accessible portions. If after fifteen minutes the septum is still sensitive, the strips should be soaked in 20 per cent cocaine solution, or the powdered cocaine salt may be carefully applied to the sensitive areas.

In any case adrenalin solution should be applied so as to cause vascular constriction, and it is important to allow twenty minutes to elapse before beginning the operation, so as to make the resection as bloodless as possible.

Some operators prefer submucous injection of 2 per cent cocaine and adrenalin chloride solution. Killian¹ injects 1 cc. on each side. In some cases the injection can be utilized to raise the mucoperichondrium from the subjacent cartilage, and so aid the earlier stages of the operation itself, and, excepting in cases where the free border of the cartilage has to be resected, this is the main advantage. But the thick epithelium over the anterior end of the septum and the vestibule hinders the absorption of the applied cocaine solution, and here sub-epithelial injection is necessary in the absence of general anæsthesia.

The patient should be lying horizontally on the back, with the head and shoulders well raised; and, of course, a very brilliant illumination is essential. The resection should always be made from the convex side, if possible, otherwise the difficulties in raising the mucoperichondrium are much increased.

There are three methods of incising the mucous membrane: (1) By Freer's² triangular or L-shaped incision; (2) The single buttonhole incision; (3) The author's method of incising on both sides.

1. *Freer's L-shaped Incision.*—The commonest form of deflection is the double-angled, with a vertical and horizontal crest. The first incision is usually made, as practised by Freer, along the angle of the vertical deflection, but beginning high up, above the deflection, and extending down to the horizontal ridge. Then, a horizontal cut is made along the crest of the ridge, from the bottom of the vertical cut, extending almost to the front of the septum (*Fig. 43*). The cut must in all cases extend just into, but not through, the cartilage, otherwise the mucous membrane may be separated from the perichondrium, instead of both being lifted together from the cartilage. The triangular anterior flap of mucoperichondrium thus outlined should be carefully resected, and held out of the way by a small pledget of wool in the attic of the nose, or merely held forward by fine forceps. The mucous membrane is similarly separated below the horizontal incision, right down to the floor of the nose. Next, the mucous membrane with the perichondrium behind the crest is lifted, first by sharp—and more posteriorly by dull-edged—elevators, if necessary extending right back to the posterior margin of the vomer, and at any rate far enough to extend behind the deflections, and downwards to the floor of the nose.

Thus, the cartilage, and, if necessary, the bony septum, is exposed on the convex side over and beyond the whole of the deflection.

The cartilage is then incised, preferably with a round-edged knife, or with a small cutting chisel, the incision extending along the base of the triangular flap, but leaving not less than a quarter of an inch of cartilage along the free border, above the level of the *alæ nasi*—to prevent risk of the tip of the nose sinking in. Great care must be taken in cutting through the cartilage, not to puncture the mucous membrane of the opposite or concave side; and in order to prevent such puncture, most operators insert the tip of the left fore-finger on that side, so as to feel when the cartilage has been just cut through.



Fig. 43.—The J-shaped incision of Freer, the mucosa being raised towards the front, exposing a triangular piece of the cartilage, which is cut through along the dotted line corresponding with the base of the exposed triangle.

The incision in the cartilage is carried down to the bottom of the flap, and inserting the elevator through the opening in the cartilage beneath the perichondrium of the concave side, the mucoperichondrium is then raised from the concave side. Freer, having lifted it in front, incises the cartilage, making a small tongue-like flap by a horizontal incision carried forward to meet the lower end of the vertical cartilage incision; he finds that this makes it easier to separate the mucosa on the concave side, where, especially at the bottom of the concavity, it is often thin and very adherent.

As pointed out by Freer, the reason for making the incision along the crest of the ridge is, that the mucous membrane is often rather

adherent there, and it is easier to separate it upwards and downwards, or before and behind the ridge, than to lift the mucosa over it.

2. Killian, St. Clair Thomson³, Hurd⁴, and in fact most operators, make a single buttonhole incision, a single cut (*Fig. 44*) about a centimetre and a half behind the septum cutaneum, or columella, beginning near the floor, and extending upwards towards the attic, being about three-quarters of an inch long, and nearly parallel to the septum cutaneum, but curving away from it above and below. The disadvantage of this incision is that it is altogether in front of the deflection, and it may be some distance before the deflection is reached when the mucosa is being elevated; and if, in cutting through the cartilage by an incision corresponding to the mucous membrane



Fig. 44.—Showing the usual position and extent of the single buttonhole incision.

incision, the membrane of the opposite side is perforated, the perforation is likely to be permanent, being *vis-à-vis* with the intentional incision, and perforations in the anterior part of the septum often prove a source of trouble. On the other hand, with a single incision, trouble is less likely to arise from the curling up of the mucous membrane during the healing process unless stitches are inserted—always a troublesome matter.

3. To lessen the risk of perforation, Watson Williams first makes a very small incision in the mucous membrane of the concave side, well in front of the site selected for the usual buttonhole incision on the convex side, shown by the dotted line in *Fig. 45*. Then, sliding a very narrow elevator (*Fig. 46*) beneath the mucoperichondrium, he lifts the

mucous membrane from the cartilage, corresponding to the site of the cartilage incision, by movements which are indicated in *Fig. 47*.



Fig. 45.—Watson Williams' method. (Convex side).

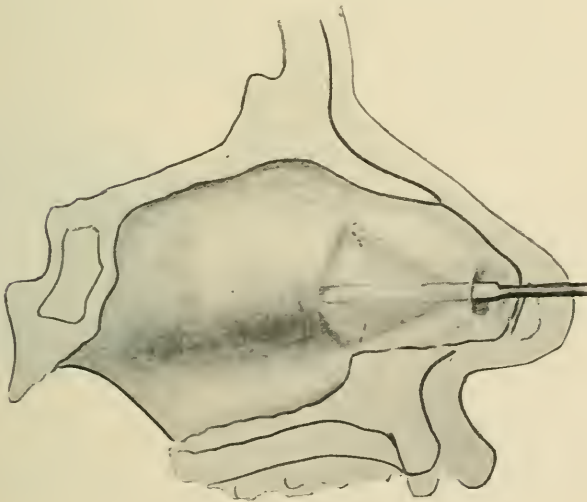


Fig. 46.—Watson Williams' method. (Concave side).

Thus, when the mucous membrane of the convex side has been raised and the cartilage is incised, there is no risk of perforating the concave

mucosa, because it has already been lifted, and the small perforation first made is in front of the usual long incision, and is well covered by mucous membrane. If only a spur or longitudinal ridge is present, the incision should extend the whole length of the ridge, curving up as it comes to the anterior end. The mucosa and perichondrium are then reflected upwards and downwards.

The subsequent steps of the operation are the same, whatever incisions have been made.

Fig. 48 shows the free edge of the cut cartilage and the mucoperichondrium of both sides held apart by the speculum so as to keep the bared cartilage free to be cut away by Ballenger's knife or by cutting forceps.

The whole of the deflection, whether confined to the quadrilateral cartilage, or extending to the vomer and perpendicular plate of the ethmoid, having been laid bare of mucous membrane and perichondrium, it now remains to remove the implicated portion of the septum. Un-

doubtedly, this has been rendered simpler by Ballenger's swivel knife, a modification of Killian's septum knife. The mucous membrane flaps being held apart in the long speculum (*Fig. 48*), the swivel knife is applied to the free edge of the cut cartilage, and carried upwards and backwards till the perpendicular plate of the ethmoid is reached, and is then turned down till it cuts to the vomer, and then forward till it comes out at the lower border of the vertical incision. The freed portion of the quadrilateral cartilage is then lifted out with forceps.

If the perpendicular plate of the ethmoid is deflected, it is next clipped away with cutting forceps. Finally, the vomer, if necessary, and the maxillary crest, are prised away with strong forceps, or removed by a chisel.

The great point is to remove the whole of the deflected portion, otherwise the result is spoiled, both by the imperfect removal of the deflection, and by the remaining portions keeping the two layers of mucous membrane apart, instead of their hanging straight and in contact, so as to yield a firm, thin, straight septum.

Having removed all the loose portions of septum between the flaps, and washed out any drops of blood, nothing now remains but to bring the edges of the incised mucosa together, and to pack the nasal passages

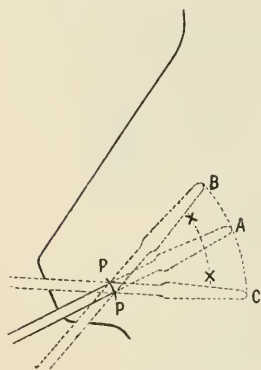


Fig. 47.



Fig. 48

PLATE IX.
OCHRONOSIS.



Fig. A.

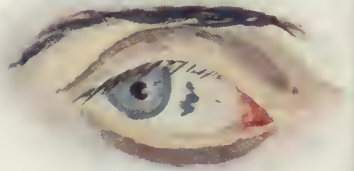


Fig. B.



Fig. C.

with strips of gauze or antiseptic wool just sufficient to exert very slight pressure. This keeps the loose flaps straight and in contact, and overcomes any tendency to hæmorrhage.

The following day all packing may be removed, and the nose be gently sprayed with warm alkaline and antiseptic solution daily. The patient should go to bed for one day, and in two or three days can go out; but should avoid dust for a week.

The accompanying figure (49) shows a case of double septal deflection completely relieved by submucous excision of the septum. Anteriorly the deflection is seen to be on the patient's right; on the left there is a marked deflection further back and higher up, obstructing the olfactory fissure or normal air tract, while further back still the deflection (bony) is to the right again.

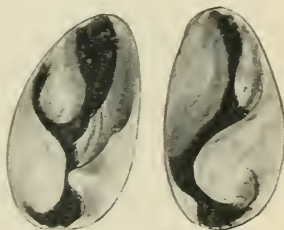


Fig. 49.

There is marked hypertrophy of the left inferior turbinal body, partly filling the concavity. This had to be removed when the septum was excised.

REFERENCES.—¹*Ver. d. Gesellsch. d. Nat. u. Aerzt.* 1899; ²*Trans. Amer. Laryng. Assoc.* 1905, p. 29; ³*Trans. Roy. Med. Chir. Soc.* vol. lxxxix; ⁴*Med. Rec.* Nov. 25, 1905.

NOSE (Diseases of Accessory Sinus). (See SINUSES, DISEASES OF.)

OCHRONOSIS.

Robt. Hutchison, M.D.

This rare condition was first described by Virchow in 1866. The following case, recorded by Frank M. Pope¹, with the accompanying coloured plates, reproduced by the courtesy of the proprietors of the *Lancet*, gives a good idea of the clinical appearances which it presents.

The patient, a woman, aged forty-seven, was admitted to the wards of the Leicester Infirmary in 1895, suffering from a large ulcer on the right leg and discoloration of the skin. The ulcer had existed for twelve years, and had been continuously dressed during that time with a strong carbolic lotion. The discoloration had existed for five years. No history of any similar complaint in her family could be obtained. The face was coloured a dark brown. Inside the lips were patches of blackish discoloration. The ears presented a bluish appearance. The hands also showed similar discoloration. (Plate IX, Fig. A, and Plate X, Fig. D.) There was a small bluish-black pigmented patch on each conjunctiva (Plate IX, Fig. B), about midway between the inner canthus and iris, when the iris was central. There were signs of a cavity at the apex of the right lung, and the patient was much emaciated. Her mother had suffered from pulmonary tuberculosis. The urine was almost black in colour; it gave a dark brown precipitate with liquor ferri perchloridi, and a slight white precipitate with bromine water. No sugar or copper-

reducing substance was present. The urine was not of the same colour every day. Grangene of the toes came on, and the patient died in a few days from exhaustion, there having been no material change in the symptoms.

Post mortem, the right lung had a dry cavity at the apex. The suprarenal bodies were hard and dark in colour. The rib cartilages were stained bluish-black; the colour was more marked in the central area than at the periphery. The cartilages of the ears were bluish-black. The intervertebral cartilages were not examined. The patches of pigment in the eyes were seen to be due to a deposit of pigment in the superficial layers of the sclerotic. The note made at the time was that microscopically the colour of the cartilages was due to "ordinary fine granular pigment."

Coloured drawings were made during life of the superficial appearances, and microscopical preparations of the skin and cartilages were made, and also of the suprarenal glands. The following is a description of their appearances by Mr. E. H. Shaw, of St. Bartholomew's Hospital:—

"*Section of ear.*—The skin is normal, no pigment being seen. The cartilage is pigmented throughout its substance, the colour being darkest externally, especially in the perichondrium (*Plate X, Fig. E*).

"*Section of skin of finger.*—The epithelium shows the ordinary structure and arrangement of a skin surface. There is no pigmentation of the cells of the Malpighian layer. In the true skin there are some irregular masses of fibrous tissue in the form of broad bands. These bands cross and interlace with one another, and they are of a dark-brown colour in the central part. The bands are pure fibrous tissue; no striation or nuclei are visible. The pigment is confined to these bands, it is not granular, and is evenly distributed through their substance" (*Plate X, Fig. F*).

Description of coloured plate.—The appearance of the patient is well shown in the illustration. The face (*Plate IX, Fig. C*.) is very dark, and bears a striking resemblance to a marked case of Addison's disease. *Plate IX, Fig. A*, shows the pigmentation of the deep layers of the skin in the finger and beneath the thumb nail, and *Plate X, Fig. D*, that of the palmar surface of the same hand. The patch of pigment in the sclerotic is shown in *Plate IX, Fig. B*. The pigmented cartilage of the ear can be seen in *Plate IX, Fig. C*, shining through the integument. The microscopical appearance of the cartilages of the ear is shown in *Plate X, Fig. E*. This section has been rather deeply stained with hæmatoxylin, and consequently the most deeply pigmented layer of cartilage (*s.l.*) appears rather lighter than the less deeply (*d.l.*), the exact opposite of its appearance in the unstained specimen. Particular attention should be paid to *Plate X, Fig. F*.; compared with a section or drawing from a case of Addison's disease, the difference in the site of the deposited pigment is at once apparent. In the present section it entirely appears in the fibrous bands (*f.l.*), and brings to light the extent of this layer, acting as a differential



Fig. D.

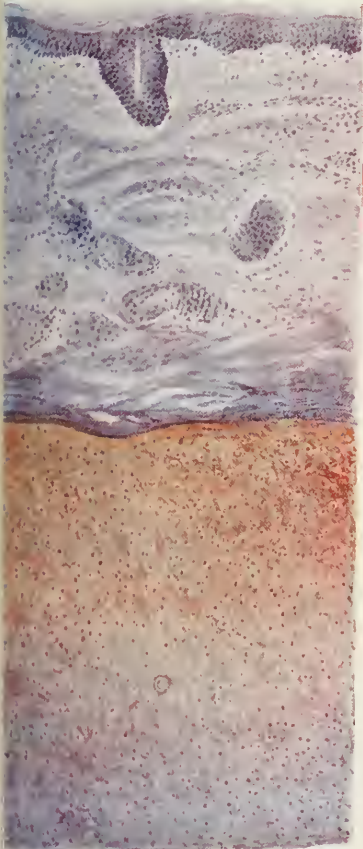


Fig. E.

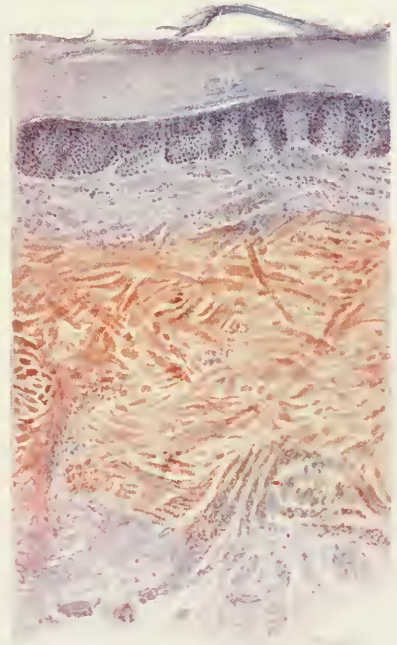


Fig. F.

W.H. Rudge

x 105

r. M

f. b.

x 85

stain for this tissue, while in Addison's disease it appears, as does the normal pigment in the coloured races of mankind, as a very thin deposit in the deepest layer of the rete Malpighii (*v.M.*).

Pope states that his case is only the eleventh yet published, and the first that has been reported in this country. He has summarized these cases in a table in the *Lancet* article, to which reference may be made. Pick², however, has recently described another case in a woman of seventy-seven, which presented an extraordinary resemblance to Pope's in that in it also chronic ulceration of the legs had existed for years, and had been treated by carbolic applications. The clinical appearance presented by his patient was almost identical with that depicted by Pope, but there was no pigment in the urine, and after death the distribution of the pigmentation was found to be even more widespread than in previous cases, affecting not only cartilages but connective tissue as well, e.g., the fibrous layer of the skin and the adventitia of vessels, in addition to striped and unstriped muscle and the parenchyma of the kidneys. Pick's case is described most exhaustively, and he also summarizes previous cases, pointing out that there are several inaccuracies in the epitome furnished by Pope.

It is generally admitted that the pigment in ochronosis does not contain iron; but two views have been held as to its origin. Some writers believe that it is derived from blood pigment, others that it belongs to the melanin group. Pick favours the latter view. He considers that the pigment of ochronosis is closely allied to melanin, and diffuses from the blood into cartilages and connective tissue, although it can subsequently condense into darker coloured granules. Sometimes the pigment contains fat, as evidenced by a positive reaction to Sudan red. He believes, further, that it is derived from the aromatic (tyrosin, phenylalanin) radicle of proteid and its hydroxylized products under the action of a ferment (tyrosinase). Prolonged entrance into the blood of small quantities of phenol excites—as in the author's case and Pope's—"exogenous" ochronosis; the same condition can be produced "endogenously" in alkaptonurics, by the action of tyrosinase on alkaptonuric acids, or in any individual in whom, by the gradual destruction of cells, the aromatic radicles of proteid are liberated in sufficient amounts. Such a destruction of cells can take place under the influence of various factors (old age, gouty or rheumatic diathesis, etc.). In many cases the pigment, or a precursor of it, is excreted in the urine (ochronosic melanuria). Such urine darkens on standing.

A. E. Garrod, in an addendum to Dr. Pope's paper, discusses the relation of ochronosis to alkaptonuria as follows:—

The question of the relationship of the very rare conditions, ochronosis and alkaptonuria, is a very interesting one. The existence of such a relationship was first suggested by Albrecht. The urine of his patient, who had the blackening of cartilages which constitutes ochronosis, was brown when passed, darkened on standing, and

reduced Fehling's solution with the aid of heat and ammoniacal solution of silver nitrate in the cold, just as an alkaptonuric urine does. However, Zdarek failed to extract from it homogentisic or uroleucic acid, to the presence of which the phenomena of alkaptonuria are due. Osler has since described a pigmentation of the ears, conjunctivæ, and skin, such as was observed in Albrecht's case, in three middle-aged men, who have long been known to be alkaptonuric; and although no opportunity has presented itself of examining their cartilages, there is every reason which external indications can afford, for believing that the cartilages, and at least those of the ears, are deeply pigmented, and that they may rank as examples of ochronosis. On the other hand, in such accounts of necropsies on alkaptonurics as are available, there is no mention of blackening of cartilages, and although alkaptonuria is a life-long condition, young subjects exhibit no surface pigmentation. In the cases of ochronosis recorded by Hansemann, and by Hacker and Wolf, dark urine had been passed for many years. Langstein has shown that the urine of Hansemann's patient gave none of the reactions of alkaptonuria, and in the case of Hacker and Wolf, as in the present case, the urine had no reducing properties, a fact which practically excludes alkaptonuria. It is most desirable that in future cases of ochronosis, the fresh urine should be examined from this point of view. At present the evidence seems to show that among the few recorded cases of ochronosis in which black urine, or urine which blackened on standing, was passed, some at least were not examples of alkaptonuria. On the other hand, there are very strong grounds for believing that in later life alkaptonuric subjects tend to develop the characteristic pigmentation of cartilages; in other words, that alkaptonuria is a cause, but not the *only* cause, of ochronosis.

Langstein³ deals with the same question *à propos* of Pick's case, but without throwing any further light upon it.

REFERENCES.—¹*Lancet*, Jan. 6, 1906; ²*Berl. klin. Woch.* Nos. 16–19, 1906; ³*Ibid.* No. 19, 1906.

ŒDEMA OF LUNG. *Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.*

Coplin¹, in an excellent paper on this subject, quotes Cohnheim's dictum that "a man does not die because he gets œdema of the lung, but he gets œdema of the lung because he is on the point of dying;" but disagrees with him. He does not consider that all, or even most, pulmonary œdema is agonal. He says "less than 20 per cent showed pulmonary œdema sufficient to attract attention." He found it in only 405 out of 2030 post-mortems, and in several of these it was one-sided only. He recounts how it can be produced artificially: by injections of water, muscarine, prussic acid, salicylate of methyl, amyl nitrite, compression of left ventricle, adrenalin, etc. He thinks there are two distinct varieties in man: (1) That which is part of a general dropsy; (2) The acute fulminating form, unaccompanied by general dropsy, often rapidly fatal, described under various names by other

observers, as "paroxysmal œdema," "angioneurotic œdema," "œdematous congestion," "acute suffocative pulmonary œdema." This form resembles many of the experimental types. From various authorities he gives the following conditions under which it may occur. Thus we have it with chronic nephritis, parenchymatous and interstitial (but, perhaps, especially interstitial), particularly when associated with aortitis or arteriosclerosis. He thinks that some attacks of so-called renal asthma are due to this form of œdema, which is apt to recur. Other causes mentioned are scarlet, rheumatic, and typhoid fevers, measles, influenza, and toxæmic states; after tapping the chest or abdomen; and with myocardial degeneration. With all these confusing conditions he cannot definitely put any one etiological factor as the cause; roughly it is mechanical (heart failure, blocking of circulation, etc.), or septic, or toxic. German pathologists strongly favour the mechanical, whilst the French uphold the toxic theory. Coplin thinks that many cases, at any rate, are toxic, but that the facts that pulmonary œdema may run its course in less than three hours, and that, clinically, arterial tension is greatly increased, suggests the mechanical origin in others.

MORBID ANATOMY.—He gives the well-known macroscopic appearances; there may be no fluid in the pleura—usually some. Microscopically he advises the use of very rapid and powerful fixing agents, as there is some difficulty in fixing the thin albuminous exudate. He gives drawings (*Figs. 50 and 51*, kindly lent us by the proprietors of the *Therapeutic Gazette*) which show: (1) Most alveoli filled with finely granular material, the precipitated proteids of the albuminous exudate; (2) Swollen septa, showing some infiltration with similar granular material and a few mononuclear cells; (3) Some of the lymphatics and capillaries are engorged, others empty. In fact the œdema is definitely both intra-alveolar and interstitial.

SYMPTOMS.—The acute form is of sudden onset, with oppression, often agonizing pain in the chest, and air-hunger; the breathing soon becomes quick and shallow, cyanosis rapidly appears, and the extremities become cold. There is often a copious pink- or salmon-tinged expectoration. In those cases in which it is absent the distress is greater. A great rise in arterial tension is the rule, which is maintained for a short time, followed by a rapid fall as the heart fails: delirium and unconsciousness are common. The average duration of such an attack would be three to four hours; it is generally fatal, but if recovered from is apt to recur again and again, until a fatal issue occurs in some subsequent attack.

PHYSICAL SIGNS.—Râles and rhonchi all over the chest, which rapidly increase in amount. The most marked sign is a rather rapid occurrence of hyper-resonance, which obscures the area of cardiac dullness, and is due to the over-distension of the lobules with air. This curious sign has been called "paradoxical percussion," because with œdema one would expect impaired resonance. Wethered², speaking of this hyper-resonance, says that it only occurs in the front

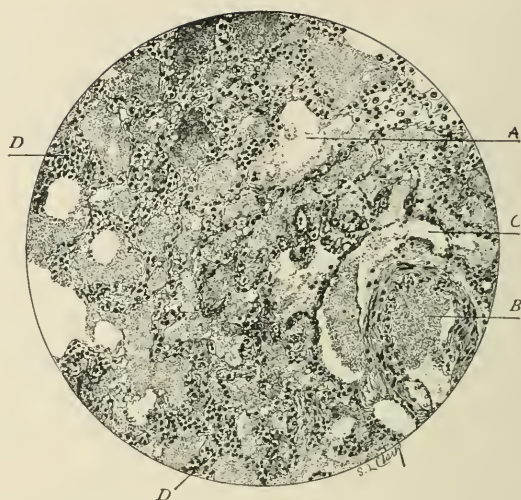


Fig. 50.—Lung, Experimental (Adrenalin) (Edema. *A*, air vesicle, practically empty; *B*, artery containing a granular thrombus; *C*, lymph space, partly occupied by granular material; *D*, *D*, intervesicular septa, the connective tissue substance of which is dissociated; in some areas an infiltration by mononuclear cells is also present. Such elements are particularly abundant at the points indicated by the leaders from *D*.

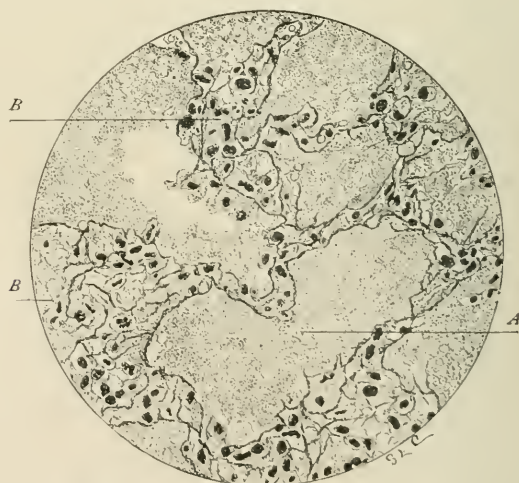


Fig. 51.—Lung of Rabbit, Experimental (Adrenalin) (Edema. (Zeiss, 2 mm. obj., proj. ocular; reduced one-half.) The alveoli are practically filled by a granular material that stains by acid dyes. The intervesicular septa are swollen, and at points conspicuous separation of the fibrous and elastic tissues is present. *A*, air vesicle containing granular material; other vesicles are also shown. *B*, *B*, swollen septa; the finely granular material in the interstitial tissue is evidently the result of precipitation of proteids by the fixing agents.

of the chest, but that, at the same time, impaired note will be found at the posterior bases. Coplin (*loc. cit.*) goes on to show how difficult such cases sometimes are to distinguish from those of paroxysmal, renal, and cardiac asthma, and that sometimes the extreme pain in the chest gives rise to the suspicion of pleurisy.

TREATMENT.—He strongly advocates **Venesection** (10 to 20 oz.). Wet and dry cupping is less efficacious. Purgation and the administration of **Cardiac Stimulants**, such as caffeine, strychnine, musk, camphor, digitalis, ether, and alcohol, are useful supplements, but can never take the place of bleeding. **Oxygen Inhalations** are always useful. When an attack has occurred, the great likelihood of a recurrence must be remembered, and the patient warned against exposure to cold, exertion, and dietetic, alcoholic, and sexual excesses, whilst his friends should be told of the great danger overhanging his life.

Wethered agrees in the main with what has been said of the acute form of pulmonary œdema, and adds two more classes of cases—the subacute and the chronic. *The subacute* occur with emphysema, failing heart, with myocardial or endocardial disease, and after influenza. In this less acute form he recommends **Purgation** and **Heart Tonics**. His *chronic* form he would like to call "*râles heard at the base of one lung.*" The condition is persistent, and is found under the following circumstances: chronic nephritis, glycosuria, anæmic conditions, old lung troubles such as old patches of collapse, bronchiectasis and fibrosis, early basic tuberculosis, after thoracentesis—for months. He believes that many cases of so-called unresolved pneumonia are cases of œdema. Further he notes its occurrence where there is pressure on the vessels or bronchus by aneurysm or growth. This is a persistent condition, and it adds to the vulnerability of the lung, and influences our prognosis in many of the above-mentioned cases.

REFERENCES.—¹*Ther. Gaz.* April, 1906; ²*Brit. Med. Jour.* Aug. 18, 1906.

ŒSOPHAGUS (Cardio-spasm of the). *Priestley Leech, M.D., F.R.C.S.*

Mikulicz¹ drew attention to this condition some time ago, and reported 4 cases treated by dilatation of the cardiac end of the œsophagus. The following causes are given:—(1) Primary cardio-spasm; (2) Primary atony of the musculature of the œsophagus; (3) Synchronous paralysis of the circular œsophageal fibres, with spasm of the cardia due to a vagus involvement; (4) A congenital condition; (5) Primary œsophagitis.

The symptoms are, difficulty in swallowing food and cold drinks, with a sense of pressure at the lower portion of the sternum; after a short period the material swallowed is returned, the quantity varying from a few ounces to one or two pints. Passage of a bougie is arrested at the cardia, and the contents of the œsophagus can be siphoned off apart from the contents of the stomach. The œsophagus above the cardia becomes dilated into a pouch from spasm and retention of food above.

Mikulicz recommended **Manual Dilatation**, and Erdmann² reports

a case in a woman, thirty-three years old, in which this treatment was followed by success. The diagnosis depends on the pear- or flask-shaped dilatation of the lower one-third to two-thirds of the œsophagus; the fact that the small end of the dilatation is upwards, and the contents of this dilatation can be siphoned off irrespective of those of the stomach; and, lastly, the dysphagia of the cardial type. This condition was known to pathologists for some years as idiopathic dilatation of the œsophagus. The mucous membrane is in a condition of chronic inflammation, and at times shows multiple ulcers on its surface.

The diagnosis from diverticulum of the œsophagus is difficult. Goldmann, of Freiburg in Baden³, says X-ray photographs in various positions, after filling the œsophagus with bismuth, are the best means of diagnosis between these two latter conditions. He reports a case where, after making an incision into the stomach, he was unable to reach the cardia with the hand. He then introduced a tube into the stomach by the œsophagus, and, splitting the end of the tube, the end of a pair of forceps was tied to it; the tube being withdrawn, the forceps were drawn into the cardiac orifice, and being opened up, the handles of the forceps stretched the orifice.

REFERENCES.—¹*Deut. med. Woch.* Jan. and Feb. 1904; ²*Ann. Surg.* Feb. 1906; ³*Lancet*, Jan. 6, 1906.

OPHTHALMITIS. (See IRIS.)

OPISTHORCHIOSIS.

J. W. W. Stephens, M.D.

Gaide¹ records thirty-one cases of infection with *Opisthorchis sinensis* among Annamites in Tonkin. The liver may contain thousands, not always visible on section of the organ, but escaping on pressure from the biliary passages. Their occurrence in the gall-bladder itself was noticed in three out of twenty-seven cases. The flukes are also found in the upper part of the small intestine. Apparently blackwater fever also occurs among the natives (?)

Korenchevski² records a case due to *O. felineus* = *Distomum sibiricum* in Russia (?).

REFERENCES.—¹*Ann. d'Hyg. et. de Méd. Colon.* 1905, p. 568; ²*Roussky Vrach*, Sept. 1905.

OSTEOMYELITIS, Suppurative. (See INFLAMMATION.)

OVARY (Disease of).

Arthur E. Giles, M.D., B.Sc., F.R.C.S.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

The Corpus Luteum.—Not much new work on the ovary has appeared during the last year. Lockyer¹ has continued his interesting investigations into the physiology and pathology of the corpus luteum, with special reference to the significance of the "lutein cyst." The importance attached to the corpus luteum by modern observers is well known, and was referred to in the *Medical Annual* of last year. Lockyer is by no means convinced that the amount of lutein tissue

in the ovaries is necessarily increased in that dire event chorion-epithelioma of the uterus. In this opinion he runs counter to Pick, who said that such association was invariable.

Hæmatoma of the Ovary.—Harold Wilson² and Smallwood Savage³ have independently described the pathology of that interesting condition known as the ovarian blood-cyst or ovarian hæmatoma. These are those extraordinary cases in which the ovary—not much enlarged—is converted into a blood-cyst whose walls of variable thickness are the stretched ovarian tissue. In advanced cases the organ may present the appearance of a ripe plum. Very rarely such a cyst may even rupture, with intraperitoneal hæmorrhage. The most striking point about these cases is their usually sudden onset. Savage has arrived at the following conclusions:—

(1) The disease is one of the first half of menstrual life, and occurs equally in married and unmarried; (2) It tends to be bilateral; (3) Some cases may be associated with septic infection; (4) The onset is usually acute; (5) Menstruation is not affected; (6) Adhesions are common; (7) There may be one or many loculi; (8) Microscopically the cyst wall may correspond to that of the developing follicle, the corpus luteum, or the regressive follicle. The disease will therefore be seen to present some very striking features, and further evidence as to its causation will be welcome. Clinically it may be mistaken for various intraperitoneal catastrophes, by reason of its frequently abrupt and violent onset. Most of all it resembles ruptured tubal gestation, from which indeed it is very difficult to separate it when the symptoms are typical. The absence of amenorrhœa and the other circumstances of the case are the best guide to a correct diagnosis.

Heteroplastic Ovarian Grafting.—Morris⁴ records a remarkable case in which he grafted ovarian tissue from one patient to another for the relief of menopausal symptoms which had appeared soon after a three months miscarriage, and persisted for two years. At the same time the ovaries of the recipient were removed for cirrhotic disease. Four months later "periods" returned, and four years later the patient was delivered of a full-term child. The author states that there could be no doubt as to the complete removal of the patient's ovaries previous to the grafting operation. He has now performed 14 ovarian graftings, both homoplastic and heteroplastic, but excepting a doubtful case following homoplastic grafting, has had no other in which pregnancy followed. He has experimented largely with animals, and finds that the heterologous ovarian graft is always absorbed sooner or later. This fact, together with the peculiar circumstances of the case, the length of time that intervened before pregnancy occurred, and the possibility of all the original ovarian tissue not having been completely removed, must tend to throw doubt on the origin of the pregnancy from the heterologous graft. The case is one, however, of great interest.

Metastatic Carcinoma of the Ovaries.—Bland-Sutton⁵ has called attention to the frequency with which the ovaries are the seat of

secondary carcinomatous growths, and has pointed out the importance of examining the abdominal viscera for signs of a primary focus in all cases in which the surgeon encounters these tumours in the course of an abdominal section. Metastatic ovarian tumours are usually bilateral, and the primary focus has been found most frequently in the stomach. As the author quoted points out, an appreciation of this fact is of the highest importance, for otherwise the ovarian tumours alone may be removed and the frequently inconspicuous primary growth be entirely overlooked.

REFERENCES.—¹*Med. Chron.* Mar. 1906; ²*Lancet*, May, 1906; ³*Med. Press*, Dec. 1905; ⁴*Med. Rec.* May, 1906; ⁵*Brit. Med. Jour.* May, 1906.

PANCREAS (Surgery of).

A. W. Mayo Robson, F.R.C.S.

Acute Hæmorrhagic Pancreatitis.—The relations between cholelithiasis and pancreatitis have been clearly demonstrated, and the acute condition was shown by Opie to have occurred in a case where a gall-stone became impacted at the papilla, in which the anatomical arrangement was such that the common bile-duct and the duct of Wirsung were thus made continuous on account of the ampulla of Vater being longer than usual.

At first there was a question whether the injection of pure olive oil would alone create acute pancreatitis, as suggested by Opie, or, as I thought by the observation of a number of cases, whether infection might not play an important part.

More experiments have been made by Flexner, who produced acute pancreatitis by the injection of sterile solution of sodium taurocholate, and by Guleke¹, who also produced acute pancreatitis by the injection of olive oil into the ducts. It seems to have been proved that acute hæmorrhagic pancreatitis may occur apart from sepsis, though doubtless in some cases the condition may be produced by a septic infection of the pancreatic ducts. An interesting case of the condition was reported by C. H. Bunting².

Guleke (loc. cit.), after ligation of the pancreatic duct close to the duodenum in 34 dogs, injected 5 cc. of oil into the duct on the pancreatic side of the ligature. In 20 there occurred pancreatic necrosis, and in 7 chronic pancreatitis; in the remaining 7 the experiments were not valid. The dogs withstood the operation well, and up to four or six hours there were no symptoms of prognostic importance. The dogs which were proved later to have suffered from chronic pancreatitis, appeared active after twelve to twenty-four hours, but those with acute necrosis were suddenly seized with rapid failure of general vitality. They appeared languid, and responded poorly to external stimuli, vomited very frequently, and many had convulsions. Breathing was hurried and feeble, pulse rapid, and temperature slightly elevated, though occasionally subnormal; collapse occurred shortly before death, which occurred in from six to twenty hours after operation. In only three cases of necrosis was the fatal termination delayed from three to six days. Glycosuria only occurred where there was total necrosis.

The experiments proved that fat necrosis is produced secondarily, as the result of primary necrosis of the pancreas, when a direct diffusion or an absorption and transportation of its secretion through the lymph vessels takes place. The dogs which had chronic pancreatitis appeared healthy for seven to ten days, then had loss of appetite, became emaciated, passed fatty stools, and died in seventeen to twenty-one days. Only one strong young animal survived. The experiments apparently proved conclusively that trypsin poisoning is the true cause of death in acute necrosis of the pancreas.

Chronic Pancreatitis.—During the past year I have had a largely increased operative experience of chronic interstitial pancreatitis, and described in detail³ the clinical course of a well-marked case in which I was able to remove a portion of the pancreas, and so to demonstrate without any possible question of doubt the nature of the disease. The patient, who was very deeply jaundiced, was treated by cholecyst-enterostomy, and made a complete and perfect recovery. The pathological investigations made by Dr. P. J. Cammidge are described in the paper.

An important monograph on the subject has been written by Georges Daviau, of Paris, in which he refers to all the cases published up to date.

Removal of a Multilocular Cystic Tumour.—John D. Malcolm⁴ records a second case in which he has been able to remove completely a multilocular cystic tumour of the pancreas. Although the operations were not easy, there were no important manipulative difficulties.

As drainage of a multilocular cyst cannot be really curative, it is quite clear that nothing but complete removal can be of use.

REFERENCES.—¹*Arch. f. klin. Chir.* Bd. 87, Hft. 4; ²*Johns Hop. Hosp. Bull.*, Aug. 1906; ³*Lancet*, Dec. 23, 1905; ⁴*Ibid.* June 16, 1906.

PARALYSES (Transient, due to Arterial Spasm). *Purves Stewart, M.D.*

Within the past few years this group of affections has attracted considerable attention. The most familiar example is Charcot's classic "*claudication intermittente*," in which the patient, most commonly a middle-aged man, perhaps of gouty constitution and often an inveterate tobacco-smoker, has pain and weakness in the legs when he walks a few steps: these may be so severe as to render the patient, for a few minutes, unable to walk. When he rests, the pain and weakness pass off, only to return on fresh exertion.

If we examine the patient during a paroxysm, we find his legs and feet cold and perhaps slightly cyanosed, and the pulse in the posterior tibial, or in the dorsalis pedis artery, is for the time absent, owing to a condition of spasm of the vessel. The arteries in such patients are often in a state of chronic arteriosclerosis, so that, during walking, an increased blood-supply to the muscles is not forthcoming.

Similar conditions, however, may also occur in the vessels of the spinal cord. The symptoms vary according to the particular region of the cord whose blood-supply is temporarily obstructed. Thus the

rare disease known as *family periodic paralysis*, where the patient becomes for a few hours afflicted with flaccid motor paralysis of the limbs, loss of reflexes, and temporary loss of electrical excitability in the paralyzed muscles, is possibly due to a spasm of the anterior spinal artery, which supplies the grey matter of the cord. The white columns, having a separate arterial supply, are unaffected; hence there are no sensory symptoms. In other cases, where vascular obstruction affects the territory of the white matter of the cord and the posterior roots, the patient may have paroxysmal girdle-pains and paræsthesiæ around the trunk, not unlike the girdle-pains of tabes, but without any of its physical signs.

Angiosclerotic spasm may also affect the vessels of the medulla oblongata. The symptoms have been specially studied by Grasset¹. Slight cases may have nothing more than transient vertigo; more severe ones, in addition, paroxysmal bradycardia, tachycardia, and irregularity of respiration.

Lastly, a few cases have been observed of cerebral arterio-spasm, producing transient hemiplegia, more or less complete (and, when right sided, associated with aphasia), in which, after a few hours, the signs and symptoms entirely disappear, sometimes with absolute suddenness. Langwill² has recorded several such cases in elderly men, and I myself have had a case of the same nature under my observation for several years at the Westminster Hospital. The patient, an elderly man of unexceptionable habits, without history of syphilis or other constitutional disease, has had a large number of temporary hemiplegic attacks, clearing up entirely in the intervals.

All such cases, however, it should be noticed, occur in subjects whose arteries are already more or less sclerosed. We should give a cautious prognosis, inasmuch as arteriosclerosed arteries are just those in which, at a later date, it is common for thrombosis or hæmorrhage to supervene. Such temporary angiospasmodic affections should therefore be regarded as a danger signal, and should lead us to place the patient upon a careful **Dietetic Regimen**, so as to arrest the arteriosclerosis if possible. Small doses of **Iodide of Potassium** are of particular value in these patients.

REFERENCES.—¹*Rev. Neurol.* May 30, 1906; ²*Scot. Med. and Surg. Jour.* June, 1906.

PARALYSIS AGITANS.

Purves Stewart, M.D.

It is important to remember that in this disease tremor is not necessarily present. Many cases run their course without tremor, and in them it is the characteristic rigidity which establishes the diagnosis. Sometimes the latent tremor is elicited, as Oppenheim¹ points out, by active movement of the limb or by plunging it into cold water. He also describes a false ankle-clonus which is characteristic of the disease. To elicit it, the foot is strongly dorsiflexed and held in that position for some time; when it is released, a rhythmical tremor may appear. The cases most difficult of diagnosis are those

in which there is merely a degree of rigidity on one side of the body. It may be taken as a general rule that a slowly-developing stiffness and clumsiness of the limbs on one side, coming on in advanced years, is generally paralysis agitans. The stiffness generally shows itself earliest in the hand or foot. A peculiar sign in the foot is that an attempt to move the toes on the affected side produces associated movements in the toes of the opposite side; the reverse is not the case. In paralysis agitans not only does the handwriting become less rapid, but the letters are smaller in size than formerly.

The disease being progressive, cure is out of the question. The most we can do is to retard its progress and to palliate some of its symptoms. Massage of the muscles is worse than useless; it simply increases the rigidity. But **Passive Movements** of the limbs tend to diminish the rigidity and to alleviate some of the discomfort. It is well to have several short *séances* daily, each lasting from five to ten minutes. **Graduated Exercises** are also useful.

Of the drugs hitherto employed, **Hyoscine** has perhaps been found the most frequently beneficial. It may be given in pill, $\frac{3}{320}$ to $\frac{1}{200}$ gr. daily. Or one may give a closely analogous drug, **Hydrobromide of Scopolamine**, by hypodermic injection, beginning with excessively minute doses, $\frac{1}{840}$ gr. to start with, increasing cautiously day by day, observing how much each individual case can bear without toxic effects. This treatment may be continued for many months with considerable benefit.

REFERENCE.—¹*Deut. med. Woch.* 1905.

PARALYSIS (Infantile).

Prof. G. F. Still, M.D.

ETIOLOGY.—One of the unsolved problems of medicine is the *fon et origo* of infantile paralysis. Is it due to some specific infection? Is it necessarily an infective disease at all? Or is the clinical picture which we call infantile paralysis merely the outcome of vascular lesions which may be due to a variety of causes? Guthrie¹ regards it as on the whole most probable that infantile paralysis is due to some specific organism, which attacks the nervous system the more easily when the child is depressed by the lowering effect of one or other of the specific fevers. In favour of this view is the occurrence of epidemics of infantile paralysis, and the marked seasonal incidence of the disease during the late summer and early autumn months. The present writer² points out, however, that in some respects the epidemics have differed from the ordinary sporadic disease; the latter is very rarely fatal, whereas in some epidemics there has been a high mortality. The sporadic disease hardly ever completely recovers; in some epidemics nearly half the cases have recovered completely. The occurrence after specific fevers is inexplicable on the supposition of a simple thrombosis of small vessels such as is known to occur in larger vessels after specific fevers. The seasonal incidence may be due to other influences than bacterial, as is exemplified in the very striking seasonal incidence of spasmus nutans, which no one has ever supposed to be due to bacteria.

The question must remain *sub judice* until some bacteriological discovery settles the difficulty. Lumbar puncture in one case (Schutze³) showed diplococci resembling those of cerebrospinal meningitis; in two other cases diplococci were found in the ventral cornua of the cord (Brooks), but in none was any culture obtained; so that up to the present there is no proof even that the disease is due to bacteria of any sort, much less that it is due always to one specific micro-organism.

Trevelyan⁴ amongst 46 cases saw 19 in boys and 27 in girls; the present writer (loc. cit.) saw 50 in boys, 37 in girls; and most observers seem to have found it more frequent in males than in females. Trevelyan noted 37 out of 46 cases to have been attacked within the first three years of life, and the present writer points out the very striking maximum incidence in the second year of life.

SYMPTOMS.—The mode of onset varies much. In most cases there is an acute febrile disturbance, perhaps with vomiting, headache, constipation, and some pain in the back or limbs, and after a few days the child is found to be paralyzed in one or more limbs. In some cases the onset is entirely insidious; the first thing noticed is weakness; and this, perhaps, only when there is already considerable wasting. Rarely the onset appears to be sudden, perhaps even instantaneous: the child running about in apparently perfect health, falls down, and is picked up paralyzed. As Trevelyan points out, the paralysis is much more extensive for the first few weeks after the onset than it is subsequently. Many of the paralyzed muscles recover completely, leaving only a few paralyzed in most cases; indeed, he says the more widely distributed the paralysis the more extensive the recovery, and in the exceptional cases where the initial paralysis is very limited, there is usually very little recovery. The present writer (loc. cit.) has pointed out that although there is no permanent alteration of sensation in infantile paralysis, there is often some tenderness of the affected limbs in the early stage, and occasionally diminution of sensation has been observed during the first few days of the disease. The loss of tendon-jerks, which is often mentioned as characteristic of infantile paralysis, is by no means constant: the writer found the knee-jerk present in 24 out of 64 cases in which the lower limb was affected.

Trevelyan says that the electrical reactions afford invaluable evidence as to the likelihood of recovery. If there is no reaction to faradism in two months, permanent loss of power, more or less complete, is to be feared. Muscles which present the reaction of degeneration ought to be looked upon as at least threatened with complete and permanent paralysis.

DIAGNOSIS.—In the early stage, infantile paralysis is apt, as Parker⁵ points out, to be mistaken for rheumatic fever or influenza. Trevelyan mentions a case in which acute rheumatism in a girl aged six years was complicated by infantile paralysis, but such a coincidence must be very rare. More often some tenderness about a limb, with fever, suggests rheumatic fever, but the symptoms are all part of the infantile paralysis. Meningitis may be closely simulated by cases in which the infantile paralysis affects cranial nuclei, producing squint or facial weakness,

with convulsions or drowsiness. Parker mentions also Erb's paralysis, in which one upper limb hangs flaccid, as a result of injury to the cervical flexus at birth, as causing difficulty in diagnosis: but the date of onset will suffice to eliminate this. He refers also to the cerebral palsies, but here the paralysis is more or less spastic, and the electrical reactions are unaltered. Neuritis is more likely to be associated with much pain and tenderness, but it is sometimes very difficult, if not impossible, to distinguish between neuritis and infantile paralysis; indeed, as the present writer⁶ has pointed out, the records of certain epidemics of supposed infantile paralysis strongly suggest that in some cases there was neuritis.

TREATMENT.—Trevelyan thinks that in the early stage of the disease a too active treatment, for instance the application of counter-irritation or of icebags to the spine, is not desirable; but **Warm Packs** may be useful, and if stupor is present, it may be advisable to give a **Warm Bath**, and hot diuretic drinks should be given with the idea of promoting the elimination of the poison. Parker recommends the application of **Linseed Poultices** with mustard along the spine at the onset of the disease; he also advises the administration of **Ergot** and **Iodides**. Ergot may be given in doses of 10 min. of the liquid extract to a child of eighteen months, and of 30 minims to a child of five years, three or four times a day.

Systematic **Massage** and active and passive **Gymnastics** are to follow later, and Trevelyan thinks it is good to let the child kick about in a warm bath once or twice a day. Galvanism, he says, may be used, but after a year it is doubtful whether much benefit will be derived from it. The overstretching of paralyzed muscles is to be carefully guarded against, as it tends to prevent recovery of power. The weight of the bedclothes must not be allowed to contribute to the increase of foot-drop. The present writer has emphasized the un wisdom of encasing a paralyzed limb in a rigid apparatus which effectually prevents any exercise of the very muscles which, being weak, most require to be used; on the other hand, certain deformities, for instance talipes valgus or genu valgum, may be aggravated by walking without support. The ideal to be aimed at is probably the least and lightest amount of support which will prevent the increase of deformity and allow the largest freedom of exercise to groups of muscles which are only partially paralyzed.

REFERENCES.—¹*Clin. Jour.* July 5, 1905; ²*Ibid.* July 25, 1906; ³*Münch. med. Woch.* xxxviii. p. 1197; ⁴*Brit. Jour. Child. Dis.* April, 1906; ⁵*Hosp.* Aug. 4, 1906; ⁶*Pract.* Feb. 1905, p. 225.

PARALYSIS TREATED BY NERVE-ANASTOMOSIS AND NERVE-GRAFTING.

A. H. Tubby, M.S., M.B., F.R.C.S.

Robert Jones, F.R.C.S. Ed.

In the performance of any movement, the elementary factors at work are voluntary impulses in the brain, conduction and possibly reinforcement in the spinal column, and conduction through nerves and muscles which have fixed origins and insertions. Interruption

anywhere in the path of a nerve impulse, or destruction of a muscle, results in the loss of a definite voluntary movement.

It may be granted that in many forms of paralysis the limits of medical treatment are quickly reached. Thus has come the surgeon's opportunity. While he is not yet able to anastomose or transplant areas in the brain, and paths of conduction in the spinal cord, considerable progress has been made in rearranging the remaining factors in the production of voluntary movements, namely, the lines of impulse in nerve and muscle.

From 1881 onward, a great amount of work has been done on muscle transplantation and tendon anastomosis, and a high degree of success has followed. It therefore seems quite natural that the leap should be made from muscles to nerves. If we consider a case of infantile paralysis, for example, we recognize that the affection in the nerves and muscles is secondary to disease in the spinal cord; and if we can succeed in conveying to a non-energetic muscle by another channel, impulses from a healthy part of the spinal cord, we ought to be able so to refresh the muscle substance that it can resume its work. In fact, the principle has now been established that the central end of an efferent fibre can make functional connection with the peripheral end of any other efferent fibre of the same class, motor to motor for example, whatever be the normal actions produced by the two nerve fibres (Langley and Anderson, *Journal of Physiology*, 1904, vol. 31).

Spitzky¹ is responsible for the statement that muscles which have been in a state of atrophy for eight years may be regenerated if a new path of nerve conduction is established, and the extraordinary results obtained from nerve crossing have opened up a very fascinating field in surgery.

It seems that the earliest experiment in this direction was performed by Fleurens² in 1824. He divided the nerves from the brachial plexus in a cock, one set of nerves supplying the muscles of the superior, and the other those of the inferior surface of the wing. After section he joined the proximal end of one set to the distal end of the other, and *vice versa*. After a time co-ordinated movement was observed in the limb. Since then many other observers have performed similar experiments, and some have even joined sensory to motor nerves, with the expected result that no functional union followed. Experiments were made in this direction by Schwann³ and Bidder⁴.

In crossing experiments there is considerable risk of the nerves at the point of anastomosis becoming matted together in a common cicatrix, and one of the surgical indications in the operation of nerve anastomosis is to carefully guard against this contingency. Rave⁵ used only one crossing, and excised a considerable length of other nerves. Thus he crossed the vagus and hypoglossal, widely removing one or the other nerve, as the case was; and, in the animals which survived, the function of the vagus or hypoglossal was apparently carried on by the crossed nerve.

Langley⁶ united the proximal end of the vagus to the distal end of

the cervical sympathetic, and found that the vagus had acquired an influence over all the structures innervated by the latter nerve.

In the later experiments on nerve anastomosis and nerve crossing, no excision of a part of one of the nerves has been done, but both nerves are retained, and some method of preventing union between the central and peripheral ends of the same nerve is adopted. The experiments are so full of surgical possibilities that they may be shortly described.

Stefani⁷ operated on the fore-limb of a dog, and crossed the median and musculo-spiral nerves. After 202 days, good co-ordinated and voluntary movements were restored, but two out of three of his experiments were vitiated by some of the central fibres joining the distal ones in the same nerve.

Cunningham⁸ obviated this by wrapping round the nerves at the point of suture a layer of fascia. In his experiments he crossed the musculo-spiral with the whole of the nerves supplying the flexor muscles. After seventeen months, electrical stimulation showed that the central end of the musculo-spiral had united with the peripheral end of the median and ulnar, resulting in flexion of the limb. Attempts at the finer voluntary movements were, however, very unsatisfactory. He therefore concluded that after crossing two motor nerves the co-ordination would be better if such nerves had a synergic function.

Kennedy⁹ crossed the musculo-spiral with the median, musculo-cutaneous and ulnar, so interchanging the nerve supply of the whole of the flexors and extensors. He took the precaution of interposing the internal anconeus muscle between the two sets of fibres, thus avoiding the matting in a common cicatrix of the nerve fibres. This plan was successful. Stimulation of the musculo-spiral above the line of suture resulted in flexion, and *vice versa*. It therefore follows that, for restoration of function, it is not at all necessary that the old paths for nerve impulses should be restored. What is wanted is a path for nervous impulses. Even after simple division and suture of a nerve, when the exact axis of the two parts is altered, it is extremely unlikely that the central end of one fibre will unite precisely to the distal end; and if that is so, the motor cells of the spinal cord must supply muscle fibres after the operation, different from those that they supplied before. Experimentally it seems that, after cutting a nerve trunk, it unites equally well functionally, whether the axis of the trunk be maintained, or the distal piece be given a considerable twist; but after any section or injury of a nerve trunk, a considerable period of re-education must be passed through before co-ordination reappears, and it is doubtful if the very delicate movements are ever regained. It is, however, probable that the younger the animal, the more likely it is that the finer movements will reappear.

For much of the information above we are indebted to articles on an investigation on the "Degeneration of Nerves," by Basil Kilvington.¹⁰ In these interesting communications he details experiments which he has made on dogs, which will be alluded to presently.

THE STATE OF THE CORTICAL CENTRES AFTER NERVE CROSSING.

Stefani, in the work already referred to, investigated the condition of these centres, and found there was a loss of irritability in them. Cunningham observed that the cortical irritation is affected after nerve crossing, but stimulation of any particular area gave rise to co-ordinated movements. Kennedy¹¹ finds that the cortical areas for flexion and extension are interchanged after nerve crossing, and produce co-ordinated muscular action. This conclusion of Kennedy's is a most valuable one, and goes far to justify surgical interference with the nerves and muscles.

So far we have dealt with complete crossing. There are other forms of nerve grafting. Thus the central end of one nerve may be joined to the peripheral ends of two or more nerves, as for instance in the facio-accessory anastomosis. The central end of the spinal accessory is split, and one part is sutured to its own peripheral end and to the peripheral end of the facial. Faure and Furet¹² performed this operation in a case of facial paralysis, due to a bullet penetrating the ear, but no satisfactory result followed. Kennedy, however, had a successful case. Kilvington anastomosed the facial with the hypoglossal in a dog successfully.

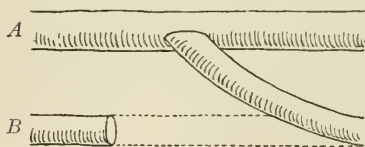


Fig. 52.

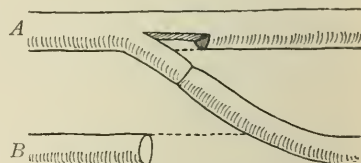


Fig. 53.

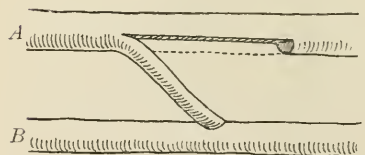


Fig. 54.

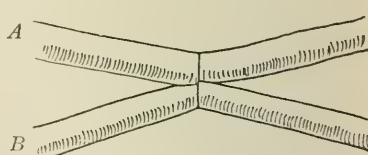


Fig. 55.

Diagrammatic representations of various modes of anastomosis. A represents the unaffected, B the affected nerve. Fig. 52, Lateral anastomosis. Fig. 53, End-to-end anastomosis of the peripheral segment of paralyzed nerve with the central end of a split segment from a reinforcing nerve. Fig. 54 The paralyzed nerve reinforced by a slip from healthy nerve. Fig. 55, End-to-end anastomosis of both central and peripheral ends of the affected nerve into the split segments of sound nerve.

(After Spiller, Frazier, and Van Kaathoven).

Other forms of nerve grafting are (1) Lateral anastomosis of the peripheral segment of the paralyzed nerve into the sound nerve (2) End to end anastomosis of the peripheral segment of the affected nerve with the central end of a slip from the sound nerve; (3) A slip from the sound nerve is inserted into the paralyzed nerve; (4) End-

to-end anastomosis of both central and peripheral ends of the affected nerve into the split segments of the paralyzed nerve.

As to the question of regeneration of nerves after section, the old view is that no regeneration takes place at all in the peripheral end, unless it is connected with its own central end or the central end of other nerves. Ballance and Purves Stewart¹³ conclude from their work that a considerable amount of regeneration takes place in the distal end of a cut nerve which remains disconnected from its central end. But Langley and Anderson's¹⁴ experiments go far to cast considerable doubt upon this theory.

In this connection it may be stated that the purport of this article is not to discuss, either experimentally, or from a surgical point of view, the question of simple section of a nerve, or the implantation of nerve tissue from other animals to supply the gap in the course of a nerve trunk, and therefore many references to experimental neurological work must necessarily be omitted.

Kilvington¹⁵ operated upon the internal and external popliteal nerves of dogs. In the first experiment he completely divided these nerves in one hind limb, and sutured the central end of the internal popliteal to the peripheral ends of the internal and external popliteal, at the same time excising about three-quarters of an inch from the central end of the external popliteal. After 139 days it was observed that the dog ran and walked almost like a healthy dog; that is to say, that the impulses formerly proceeding to muscles supplied by the intact external popliteal, now found their way down the central end of the internal popliteal, and the distal end of the external. In a second experiment he altered the arrangement of the nerves, the central end of the external popliteal now supplying the distal ends of the two nerves, but the co-ordination here was not so perfect as in the first experiment. In a third experiment, the peripheral end of the external popliteal was drawn into the internal popliteal, and fixed there: in 136 days after the operation it was noted that nothing peculiar could be detected when the animal was running about.

These experiments show that the central end of one nerve may innervate muscles through the peripheral ends of two nerves supplying antagonistic muscles. That is to say, there has been a re-education in co-ordination. In these experiments of Kilvington's, especially where the central end of one nerve is joined to the distal ends of two nerves, we are face to face with a distinct difficulty. He has shown that the number of nerve fibres in the two distal trunks conjoined, are greater than in the central nerve trunk. It therefore follows that if function is re-established, the nerve fibres in the central end must divide into two or more branches. Now, if the branches of the central axis cylinders go down one and the same distal trunk, restoration of co-ordinated movements should not be interfered with, but if they go down opposing peripheral nerves, then antagonism must follow, and in this way some of the unsuccessful results obtained in man may be explained.

Spitzky¹⁶ operated on dogs, grafting the nervus peroneus to the nervus tibialis, inserting the former into a longitudinal slit in the latter. In the course of four months the function of the limb was perfectly normal, and it was proved by electrical stimulation that conduction was re-established in the peroneal territory, via the nervus tibialis. Spitzky¹⁷ has also attempted to innervate the paralyzed anterior crural from the obturator nerve, using the superficial branch of the latter. He performed the experiment first on dogs and found that, three months after the operation, the power of extension returned. It is surprising that so small a nerve as the superficial branch of the obturator should be able to innervate the distal end of so large a nerve as the anterior crural. Spitzky in his paper gives very full references to, and a complete bibliography of, nerve grafting.

APPLICATION OF NERVE GRAFTING TO SURGERY.

Facial Paralysis.—Reference has already been made to the pioneer operation performed by Faure and Furet in 1898, when that portion of the spinal accessory which supplies the trapezius was sutured to the divided facial without success. A year later, Robert Kennedy performed the first successful Faure-Furet operation of facio-accessory anastomosis in man. Cushing¹⁸, in a traumatic case of facial paralysis, transferred the proximal stem of the divided nervus accessorius *in toto* into the distal facial, and in six months the patient was described as being nearly normal. Hackenbruch¹⁹, at the German Surgical Congress, reported a successful case of facio-accessory anastomosis in a girl aged eight years, who had had facial paralysis for seven and three-quarter years. Two-thirds of the spinal accessory nerve were implanted in the facial, and nine months afterwards the child could voluntarily draw the affected angle of the mouth outwards. At the same Congress, Körte²⁰ showed a patient in whom, one and a half years previously, he anastomosed the peripheral stump of the facial to the hypoglossal, with much benefit.

Ballance and Purves Stewart²¹ have performed seven facio-accessory and some facio-hypoglossal anastomoses. The former procedure is, however, open to the criticism that at first the associated movements of the shoulder and face are very marked, but later experience shows that independent voluntary and emotional movements ultimately return, and they are the more likely to do so if the patient is young. Ballance and Purves Stewart, however, prefer facio-hypoglossal to facio-accessory anastomosis. They further recommend that the operation be carried out if a case shows no signs of spontaneous recovery after six months. It is right to add that their cases of facio-hypoglossal anastomosis were done before Körte's in Germany.

One of the writers of this article (A. H. T.) has grafted the distal facial into the hypoglossal with marked success. The notes of the case are detailed in the Hunterian Oration, 1906²², and are reproduced here.

J. P. B., male, aged nineteen, was admitted into Westminster

Hospital on October 3rd, 1905. The patient had been a militiaman, and some months ago a large swelling appeared behind the left side of the jaw. This was opened by another surgeon on April 27th, 1905, and it was immediately after this operation that the palsy was found.

On admission the face was seen to be paralyzed on the left side. The left half of the mouth drooped; the left palpebral fissure was larger than the right; the left side of the forehead was unwrinkled: the cheek was flattened; the tongue deviated slightly to the right. The palate moved normally, the uvula being in the middle line, but food accumulated on the left side. There were also epiphora and dribbling of saliva on the left side. He could not whistle nor draw in the cheek voluntarily.

On October 16th the anastomosis was carried out. An incision was made from the tip of the mastoid process to the greater cornu of the hyoid bone, and then a dissection was undertaken to find the cut distal end of the facial nerve. This was done with much difficulty. It was traced forwards in the parotid gland, for about half an inch. A further dissection was then made to expose the hypoglossal nerve. The greater parts of the digastric and of the stylohyoid muscles were removed, and the hypoglossal nerve freed and brought upwards as near to the facial as possible. An incision was made with a tenotomy knife deep into the hypoglossal nerve, and the distal end of the facial was then inserted into it by lateral implantation. On October 23rd, that is, a week after the operation, it was noted that the palpebral fissure was lessened in size, and the eye could now be temporarily closed. On October 28th the palpebral fissure was still smaller, and the patient began to move the left angle of the mouth.

He was seen last on February 7th, 1906, when the following conditions of voluntary movements were noticed: Movement of the corrugator supercilii in wrinkling the forehead, firm action of the orbicularis palpebrarum, and closure of the eye on that side, with control over the muscles of the cheek. He could also voluntarily draw the left angle of the mouth upwards to a higher degree than the right when the latter was at rest, but in repose the left angle slightly drooped. The left ala nasi moved simultaneously with the mouth, and there was flickering of the muscles of the chin. It was striking to observe that the tongue was slightly drawn over to the right side, and there was a little thickness of speech; but the patient said that when he moved his face he was not compelled to move his tongue at the same time; thus there were no associated movements. There was some wasting of the left side of the tongue. When both sides of the face were drawn into action, the right side still overpowered the left. But despite this drawback, we venture to think this is a very successful case of nerve grafting.

Nerve Anastomosis Operations on the Upper Extremity.—In cases of Erb-Duchenne paralysis, or of infantile paralysis affecting part of the plexus, it seems that nerve grafting offers great possibilities. Wilfred Harris and Warren Low²³ described three cases in which they had

operated on the fifth cervical nerve root in the neck. Two were cases of Erb's paralysis in adults, and one was a case of infantile paralysis of the shoulder. They exposed the fifth, sixth, and seventh nerve roots close to the scalenus anticus, and each was insulated and stimulated faradically; the fifth proved to be the one affected. They cut across the fifth root, and turned it, in one of the Erb cases, into an incision made in the seventh root, and into the sixth in the other. In the infantile paralytic case they split the fifth root longitudinally, and stimulated each half faradically. The case was one of paralysis of the deltoid and spinati muscles. Stimulation showed that the lower bundles of the fifth root supplied the biceps, while the deltoid received its nerve supply from the upper bundles. They therefore sutured the upper bundles into the sixth root. They reported some improvement in one of the adult cases. A private communication, dated October, 1906, to Dr. Wilfred Harris and Mr. Warren Low, as to the present condition of these cases, has elicited the following reply, dated November 2nd, 1906:—

"Neither of the cases with the Erb paralysis recovered any power in the deltoid or biceps, though one recovered sensation in the hand over the sixth cervical segment. The third case, that of the child with infantile paralysis, recovered very fairly, so that she could put the arm straight up over the head, recovery of power being first noticed just six months after the operation." (See also *Clin. Soc. Trans.*, 1904).

In any case their work is of value as showing that in the Erb-Duchenne form of paralysis it is mainly, if not entirely, the fifth root which is affected, and not the fifth and sixth; but some authorities differ on this point.

One of the writers (A. H. T.) on October 24th, 1905, in a case of Erb-Duchenne paralysis, apparently affecting the fifth and sixth nerve roots in a child aged two and a half years, inserted the outer cord of the brachial plexus into the middle cord. On February 7th, 1906, no definite results had followed, except that the tension of the muscles of the forearm had improved.

A very exhaustive study of *brachial birth-palsy* is given by Clark, Taylor, and Prout²⁴. After giving the history of the literature bearing upon the subject in full detail, and alluding to the fact that up to 1889 all writers on the subject believed it to be due to fracture or forceps compression, these writers dwell upon the point that no mention is made of stretching or rupture of the plexus as a definite cause. A full notice of the pathogenesis of the affection is given, and with the object of throwing light upon this vexed question, the authors undertook dissections upon 10 infants dying within three to ten days after birth, and came to the conclusion that the only factor which caused damage to the nerve roots was tension induced by traction. They then discuss the location of the lesion, and show that the incidence of the strain is chiefly upon the fifth and sixth nerve roots. The pathology is clearly stated, and it is found that the nerve roots are either frayed

or pulled apart, rather than cleanly severed, and the lesion involves different fibres at different levels. There is always effusion of blood beneath the epi- and perineurium. Subsequently the deep cervical fascia is thickened and becomes irregularly adherent to the nerve roots. In severe cases, the ends of the cords are embedded in a hæmatomatous mass. From the symptomatic aspect, a point of great importance is the persistence of pain and irritability after birth when the affected limb is handled. These symptoms arise from traumatic neuritis, and cases which do not present them will show a more or less complete spontaneous recovery. In treatment, it is evident that complete immobilization is essential until the inflammatory reaction has subsided, which takes often two to four months. If palliative treatment is of no avail, it is best to wait until the end of the first year before operating, because the difficulty arising from the smallness of the parts is less. The details of the operative technique are fully described, especially the dissection necessary to a full exposure of the brachial plexus. Then the indurated areas are determined by palpation and excised with a sharp scalpel, scissors being always avoided. The nerve ends are brought into apposition by lateral sutures of fine silk involving the nerve sheaths only, while the neck and shoulder are approximated to prevent tension on the sutures. Cargile membrane is wrapped about the junction to prevent connective tissue ingrowth, and a firm application of bandages and of plaster is put on to prevent any movement of the part. Of seven cases operated upon, four died from shock. In only two cases has sufficient time elapsed to give definite results, and the increased range of movement is indicated by photographs in one case.

In infantile paralysis of the serratus magnus it would be well to entertain the possibility of separating the roots of the posterior thoracic nerve from the fifth and sixth cords, and re-inserting them into the seventh. Paralysis of the serratus magnus has been successfully dealt with by muscle grafting by A. H. Tubby²⁵.

For paralysis of the musculospiral nerve, Sick and Sängner²⁶ transferred the distal stump of a paralyzed musculospiral nerve into the neighbouring intact median, and obtained a good result.

So far, in cases of Little's disease affecting the upper extremity, no operations on nerves appear to have been performed, and at present the matter presents a very complex aspect. We have only recently performed muscle transplantation in these cases. Until we have reached the limits of improvement to be obtained by this last-named procedure, we ought not to interfere with the nerves.

Nerve Anastomosis for Athetosis.—Under the title of "Treatment of Selected Cases of Spinal and Peripheral Nerve Palsies and Athetosis by Nerve Transplantation," Messrs. Spiller, Frazier, and Van Kaathoven²⁷ discuss the subject of nerve anastomosis. But the special interest of this lengthy communication lies in their pioneer operation for athetosis. Spiller says it has been his endeavour for several years to devise some method of treatment for athetosis. In this distressing

affection the flexors are usually more powerful than the extensors in the upper limbs. It occurred to him that if we could switch off, so to speak, some of this excessive innervation of the flexors into the extensors by nerve-transplantation, we might be able to establish a more nearly normal relation between certain groups of muscles and their opponents, and by division of nerves be able to lessen the athetoid movements, probably permanently; for it hardly seemed likely that restoration of function would be so perfect as to permit a return of athetoid spasms. Nerve operations were carried out in a case where the athetoid movements in the upper extremities had been very violent for several years. As early as two and a half months after the first operation, the condition of the patient was so much improved that he was well satisfied with the results, and stated that he had never in his life been so comfortable. In effect, the induction of a partial paralysis removed the athetosis, and the latter could only return with the disappearance of the paralysis. An objection will be raised that the operation is an attempt to influence a cerebral lesion by disturbing peripheral nerves. This is precisely what it is. If the distressing peripheral effects are removed, the cerebral lesion becomes of very little account. Spiller adds that seven and a half months have passed since the operations, and the results are such as to lead him and his colleagues to believe that the athetosis will not return: and if it should, it will be far less severe than before the operation. It is important to have established that with partial paralysis produced by operations on nerves, athetosis disappears. It might have been supposed that impulses sent over the motor tracts, having been arrested in the upper limbs, would flow over into fibres destined for the innervation of the lower limbs, or that some evidence of discomfort would be observed. Nothing of the kind has occurred. After experimenting successfully on two dogs, a lateral anastomosis on the left upper extremity was undertaken, the divided median and ulnar nerves being attached to the musculospiral nerve.

The good results, so far as the athetosis was concerned, accruing from this operation, were apparent within three or four weeks. A second operation was carried out a month after the first. The circumflex and musculocutaneous nerves were divided, and an end-to-end anastomosis effected between the central end of one and the distal end of the other, and *vice versa*. A great deal of movement was ultimately regained, and this, with the disappearance of the athetosis in the left upper extremity, is most encouraging. When it is remembered that limbs have been amputated for athetosis, an operation such as the one described by these writers is a most valuable contribution to the surgery of the nervous system.

Nerve Anastomosis Operations on the Lower Extremity.—Spitzky's²⁸ experiments on dogs have already been alluded to. He advocates what is called central implantation, especially in the case of large nerve trunks. This consists in cleaving off a slip of an intact nerve, leaving it centrally attached, and fixing the free end into a longitudinal

slit in the paralyzed nerve. This is the converse of peripheral implantation, where as big a slip as possible is taken from the paralyzed nerve, the slip being left peripherally attached, and the free end implanted into the intact nerve.

Encouraged by the work of Henriksen²⁹, Young³⁰, Spiller³¹, Foramitti³², and Müntz³³, Spitzzy has pursued his researches, and is obtaining good results in neurotizing the paralyzed anterior crural by transplanting into it the superficial branch of the obturator. He has performed the operation both in the dog and on a child. It is carried out as follows in man :—

An incision 6 cms. long is made from Poupart's ligament downwards, and parallel with the femoral artery, and outside it; the small branches of the superficial circumflex iliac artery are ligatured before division, and the anterior crural nerve is defined lying in the ilio-psoas groove. The nerve is cleaned right up to Poupart's ligament, and if necessary any glands in the way are removed. A second incision is made, somewhat longer than the first, from the spine of the pubes downwards, parallel with and somewhat mesial to the tendon of the adductor longus. The external pudic artery and vein are ligatured, and the white sheath of the adductor longus acts as a guide. The sheath is opened, and the pectineus and adductor longus are held apart. The superficial branch of the obturator is then seen. There is no difficulty in separating the twigs running to the gracilis and adductor longus. The remainder of the nerve is then taken and divided below, a tunnel is made through the superficial tissues, and the central end of the nerve implanted into the anterior crural. In the two cases of children on which he operated, the results are said to be encouraging. It is fair to state that in Spitzzy's operations, up to the time of his communication in 1905, only 50 per cent of cures or improvements have been recorded.

Operations on the Popliteal Nerves.—In infantile paralysis of the lower extremity, the majority of cases fall into two groups, talipes equino-varus, where the external popliteal nerve fibres are at fault, and calcaneo-varus, where the internal popliteal nerve fibres are atrophied. The close relationship of these two large nerves in the popliteal space, and their comparatively superficial situation, naturally render them very suitable material for a nerve-grafting operation.

Several forms of anastomosis have been carried out. Thus, the healthy nerve may be partly cut across, and the peripheral end of the paralyzed one fixed in the gap so formed. This has the advantage that some of the muscles are not cut off from their nerve supply. Or the healthy nerve may be cut completely across, and its own peripheral end, as well as the peripheral end of the paralyzed nerve, sutured to the central end. The advantages gained by this proceeding are: (1) It gives all the fibres of the proximal nerve a chance of branching, which is impossible without dividing it, and the result is that a greater number of muscle cells are supplied by nerve fibres. (2) It avoids the interruption to conductivity in certain of the nerve

fibres in the healthy trunk caused by the mechanical implantation of the paralyzed nerve.

A full study of Kilvington's important articles, already referred to, should be made before any operations are carried out on the popliteal nerves. During the year 1905, one of the writers (A. H. T.) performed four operations for infantile paralysis of the leg, which are also described in the Hunterian Oration (*loc. cit.*) Two cases were most successful, and one is improving.

In a case of infantile paralysis of three years' duration, affecting the tibialis anticus muscle, J. K. Young³⁴ located the nerves to that muscle, divided them, and inserted both ends into slits in the musculo-cutaneous nerve. Eighteen months afterwards all the muscles of the anterior tibial region gave a good reaction to a slowly interrupted faradic current, but the reaction of the tibialis anticus was fainter than the others. Still it could be detected with the hand. We miss here, however, details as to voluntary movements and co-ordination.

F. E. Peckham³⁵ said he had done two cases of nerve grafting for peroneal paralysis. An improvement was noticed in both cases in two or three months. (Here again, in order to render the cases convincing, we wish for many more details).

TECHNIQUE OF NERVE ANASTOMOSIS.

The usual strict aseptic precautions should be observed, and it is important to avoid hæmorrhage, especially from small vessels, as this obscures the parts, and may render small nerve branches difficult to identify. Fine instruments are necessary, and perhaps the best are those employed by ophthalmic surgeons, when the nerves are operated upon. Forceps must not be used for handling the nerves, and in dividing them a sharp knife is always preferable to scissors, which bruise the axis cylinders. Temporary silk sutures may be used for steadying the nerves. The best material for suture is either chromicized catgut or the finest ophthalmic silk. When one nerve is inserted into another, the insertion should be made as nearly as possible in the long axis of the receiving trunk. Sutures should be placed in the length of the nerve, and not across it, because of the constriction caused thereby; they should be few in number—not more than two or three, just sufficient to retain the parts together—and they must not pass deeper than the thickness of the epineurium. When one nerve is inserted into the other, the receiving nerve-trunk must be sufficiently opened up. It is well to continue to insert the knife into it until a little white material exudes, thus showing that the epi- and perineural sheaths have been ruptured.

Cicatrization must not occur; therefore wound infection must be avoided, hæmorrhage prevented, and the nerve junctions protected from matting together. Cicatrization is absolutely inimical to success. The possibility of matting is overcome by interposing fascia or muscle between crossed anastomoses, or wrapping Cargile membrane around a new nerve junction. Accurate apposition is

essential, and too much care cannot be bestowed upon the passing and tying of sutures. Any suture which compresses axis cylinders will cause their degeneration.

After the operation, a very important thing is to keep the parts absolutely quiet, and efficient fixation for four to six weeks in plaster alone can do this, while the ultimate success depends upon the faithfulness with which after-treatment is carried out. Massage, galvanism, and exercises must be continued for six months to a year at least.

INDICATIONS FOR AND AGAINST NERVE ANASTOMOSIS.

The class of cases which is unsuitable is that where a large amount of recovery has taken place, and the limb is fairly useful, or those where extensive destruction of nerve tissue has occurred, so that the extent of muscular atrophy is very great. It would be unreasonable to expect a small, intact nerve, such as the musculo-cutaneous nerve, to innervate the muscles supplied by the internal popliteal and anterior tibial nerves. In all cases of infantile paralysis it is difficult to know how much recovery will take place, and while we are waiting for this, much fatty degeneration and atrophy of muscles sets in, and contractures form. Of course, before any nerve anastomosis is undertaken, all secondary effects of the lesion, arising from the effects of gravity and unopposed action of the muscles, must be removed. It is difficult to know the exact period during which a muscle, whose nerve is paralyzed, is capable of spontaneous recovery. Most neurologists think not longer than two years, but Hackenbruch's case of recovery of the facial muscles by means of nerve anastomosis seven and three-quarter years after the onset of paralysis is against this limit of two years; and the cases of infantile paralysis of several years standing quoted by A. H. Tubby in his Hunterian Oration also support the view that recovery may take place after re-innervation of the muscles, even if they have been paralyzed for several years.

J. Koch³⁶ has shown that when the fatty degeneration of a paralyzed muscle is scattered throughout in small areas, a large amount of regeneration in muscle fibres may take place in each area; but when the entire muscle has been transformed into fat, no such regeneration will follow. He also states that the process of regeneration sets in some time after the paralysis and fatty degeneration have occurred, the latest time being seven to nine months.

It is highly important, if possible, to select synergic nerves, such as the median to reinforce the ulnar, or *vice versa*, rather than to use opposing nerves, such as the musculo-spiral and median; and for this reason, that, with antagonistic nerves, although the coarser movements may be regained, yet it is doubtful if the finer co-ordinated movements ever reappear. Experience, however, shows that there is greater probability of this taking place in younger than in older subjects.

Before nerve grafting is embarked upon, the paralyzed muscles and

nerves must be most carefully tested electrically, and very thorough nerve and muscular analyses made. Harris and Low have emphasized this in the case of the brachial plexus. Otherwise there is a risk of healthy nerve tissue being sacrificed.

It is also advisable to test the amount of power remaining in the limbs, and the force of the individual movements, by means of a dynamometer. The operator should make sure that he is not dealing merely with a wasted and atrophied muscle, but that he is in the presence of a paralyzed muscle. A course of two or three months' massage will settle this question. If the muscle fails to recover, even partially, with massage and electricity during that time, then it is paralyzed.

With regard to electrical testing, especially in the case of a child, this should be done, not only while the patient is conscious, but also under anesthetics, when strong currents can be passed.

Most observers do not agree with Young when he says that if the reaction of degeneration is present, a nerve grafting is useless.

Before operating, we have to consider how far the operation is justified. It is a bold procedure to cut a paralyzed nerve and implant its peripheral end into a sound nerve, and it is a still bolder one to cut a slip from a healthy and important nerve. We should carefully consider what is the effect of these procedures on healthy and on paralyzed muscles. C. Körte remarked, in his case of implantation of the paralyzed facial nerve into the hypoglossal, a slight atrophy of the tongue, so that we must carefully weigh the chances of injuring a sound nerve. Again, we must think of the possibility of the appearance of inconvenient associated movements, such as occur in facio-accessory anastomosis. The crux of the whole matter is, can a muscle which has been brought to life by this operation learn to functionate independently? There is no doubt of this. Another important point is that we must avoid sacrifice of nerve fibres, healthy muscles, or sensory nerves, and therefore we must learn as far as possible the exact position of the various bundles of fibres in the large nerve trunk. In many instances, such as the popliteal and sciatic nerves, the branches to the various muscles and the sensory fibres can be traced up for a long distance in the trunk, and isolated without damage. Such a proceeding was carried out by one of us (A. H. T.) in the two operations for talipes calcaneus. In the anterior crural nerve it is important to isolate its motor and sensory portions, and the same applies to the branches of the brachial plexus. Harris and Low showed that the fibres of the deltoid run in the upper part of the fifth cervical nerve root, and those to the biceps in the lower part. It is essential to avoid, if possible, injuring the sensory fibres: if we do so, trophic ulcers will form; and to divide sensory fibres in infantile paralysis is a useless sacrifice, as they are not affected. In lateral anastomosis of nerve, raw surfaces are required, and it is futile to lay one large nerve by the side of another, as the axis cylinders cannot penetrate the tough peri- and epineurium.

In nerve anastomosis it is better to use a large nerve trunk, such

as the internal popliteal, to innervate two or more nerves, in preference to a smaller one, such as the external popliteal; as in the case of the internal popliteal there are more fibres in the central trunk to give branches which will penetrate the trunks below.

Finally, the possibility of an operation proving futile, owing to the axon reflex phenomenon, which arises from branches in the central sections of new nerves passing to antagonistic trunks, must not be forgotten, and Kilvington's valuable suggestions on this point³⁷ are well worthy of careful trial.

There is this also to be said in justification of the procedure, that if nerve grafting fails, especially in cases of infantile paralysis, we still have at our disposal muscle and tendon transplantation.

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PARATHYROID GLANDS. (See DUCTLESS GLANDS.)

PAROTITIS (Secondary).

Robt. Hulchison, M.D.

Bucknall¹, in an elaborate paper based on a personal examination of 12 cases of this affection and a study of the published records of over 200 others, defines it as an acute inflammation of the parotid, which is distinguished from primary inflammation of the gland (mumps) (1) By being always a complication of some other affection; (2) By being non-contagious; (3) By frequently ending in suppuration.

He groups the conditions during which secondary parotitis may arise, thus: (1) Acute diseases; (2) Chronic diseases; (3) Post-operative states.

1. The acute diseases during the course of which parotitis has occurred may be arranged as follows: (1) Typhus fever; (2) Enteric fever; (3) Scarlet fever; (4) Diphtheria; (5) Pneumonia; (6)

Appendicitis, salpingitis, and acute pelvic and peritoneal inflammations of all kinds; and (7) Cystitis and pyelonephritis. Of these, typhus fever, when it occurs, is most frequently complicated by parotitis, Keen, in the Toner lecture, having collected nearly 200 examples. At the present time, however, parotitis is usually met with during the course of enteric fever, pneumonia, and the different varieties of peritonitis.

2. The chronic diseases are far less frequently followed by parotitis than the acute ones. They include: (1) Diabetes; (2) Mercurial stomatitis; (3) Iodism and plumbism; (4) General paralysis of the insane; (5) Any form of grave asthenia; and (6) Disorders of menstruation.

3. The operations followed by parotitis have almost invariably been operations on the abdomen, and particularly on the pelvic organs. Many of them have been undertaken for septic disorders, and others have become septic during the performance of the operation. A certain proportion, on the other hand, have run an aseptic course from start to finish. Together they include: (1) Exploratory laparotomy; (2) Gastrotomy, gastrostomy, gastro-enterostomy, and other operations on the stomach and pylorus; (3) Enterectomy; (4) Colotomy; (5) For radical cure and strangulation of all kinds; (6) For appendicitis and other forms of peritonitis; (7) Ovariectomy and operations on the tubes and uterus; (8) Renal operations; and (9) Operations on the liver and bile passages. Of these operations, those in which sepsis has been present have been far more frequently followed by secondary parotitis than the aseptic ones; in fact, the only aseptic operation at all frequently followed by parotitis is ovariectomy as practised in former times. This special incidence will be fully explained later when dealing with the theory of origin now advocated.

TIME OF ONSET.—When occurring during the course of an acute or chronic disease, the day of the disease on which secondary parotitis arises is too variable to admit of any classification, for in some instances it has arisen during the first few days, while in others it has not appeared until the period of convalescence has been established. When following operations, the date of onset has varied from the second to the thirtieth day, but as a rule parotitis has appeared from the sixth to the eighth day after operation.

Symptomatology.—The symptoms consist in *local* swelling and tenderness, with interference with the movements of the jaw, and in *general* malaise, fever, depression, thirst, and dryness of the mouth. The symptoms reach their maximum by the fourth day, after which the local swelling may subside or go on to abscess formation.

Should pus form, the case may pursue one of several different courses. (1) The pus may slowly become absorbed, convalescence being prolonged and recovery slow. (2) The pus may find its way into the parotid duct and drain away into the mouth. (3) The abscess may be incised and efficiently opened, in which case gradual

healing of the wound usually follows, if operative interference has been sufficiently timely. (4) If left too long, the pus may burst into the mouth, or less often the external auditory meatus. In either instance it may drain efficiently: but such fortunate results after imperfect treatment are rare, and much more commonly one or other of the following accidents supervenes: (1) The patient may die from septic poisoning without the abscess bursting at all; (2) Many sinuses may be formed, and prolonged suppuration, with or without the formation of a parotid fistula, may occur; (3) The pus may burst into the joint of the jaw and destroy it; (4) It may strip up the periosteum and lead to necrosis of the jaw; (5) It may broach the jugular vein as recorded by Smith and Bloxam, the facial artery as mentioned by Bichet, or any other large vessel, giving rise to secondary hæmorrhage; (6) Thrombosis of the facial vein, or less frequently the jugular, may lead to embolic pyæmia; (7) The facial nerve may become involved, with consequent facial paralysis, which may be temporary or permanent; (8) The abscess may burrow into the middle ear or extend down the neck to the mediastinum; and (9) Dyspnœa and dysphagia may be present if the abscess should fail to burst, owing to pressure on the larynx or pharynx.

COURSE AND TERMINATION.—The mild cases all end in complete recovery, provided that the primary disease is not fatal, the most frequent sequel being facial paralysis. If pus form, the result depends on the treatment adopted, for if the abscess be opened early and thoroughly, closure without the formation of a fistula almost invariably occurs in a few days. The frequency of death in neglected cases is difficult to estimate, as some of the fatal symptoms may be due to the primary disease. There is no doubt, however, that a neglected parotitis is a serious and not infrequently a fatal complication, either of itself or by increasing the gravity of the symptoms already present and so preventing recovery. It is probable that in actual practice the milder, non-suppurating cases are far more frequent than published statistics tend to show, for there is a greater tendency, for various reasons, for the suppurative cases to be recorded. Hence the statement that half the recorded cases are of the suppurative type must only be accepted provisionally.

PATHOLOGY.—He discusses under this head (1) The pyæmic or embolic theory; (2) The heat-degeneration theory of Liebermeister; (3) The toxin-excretion theory; (4) The sympathetic theory of Stephen Paget; (5) The duct-infection theory. He considers that the last is alone tenable, and expounds it more fully as follows:—

The suggestion that secondary parotitis might be due to the direct infection of Stenson's duct with micro-organisms from the mouth was first made by Hanau and Pilliet in 1889. They found on microscopical examination of sections of the parotid (1) That the ducts were choked with débris containing micro-organisms; and (2) That the inflammatory processes present, invariably began around the ducts in the centre of each lobule, and only spread later to the periphery of the lobule and the perilobular connective tissue in which the blood-

vessels are situated. They concluded, therefore, that secondary parotitis could not be of embolic origin, or else the inflammation would have originated around the vessels, and that the fact that inflammation began simultaneously in the centres of many lobules at once, pointed to an ascending infection of the ducts as the real source of the affection, a conclusion which was further borne out by the actual presence of micro-organisms in the ducts themselves in such cases.

The writer then describes the microscopical and bacteriological evidence in support of this theory, as furnished by his own and other cases, and draws the following conclusions :—

From a study of these facts it seems highly probable that secondary parotitis is invariably due to an infection of Stenson's duct, dependent on a septic condition of the mouth, and that its onset may be prevented by attention to the following details : (1) The patient's mouth should be carefully cleansed and rendered aseptic before operations and at the commencement of long febrile illnesses. If necessary, causes of nasal obstruction leading to mouth breathing, such as adenoids, should be removed. (2) The anæsthetic apparatus should be sterile. (3) The mouth should be periodically cleansed afterwards, especially after every attack of vomiting. (4) The bowels should be opened early, and food by the mouth, and especially solid food, should be given as soon as possible. (5) Opium should not be given unless absolutely necessary. (6) The head should not be placed too low nor the binder fixed too tightly, and the dorsal decubitus should be given up as soon as possible.

TREATMENT.—Should parotitis threaten, every effort should be made to **Cleanse the Mouth** and to prevent continued re-infection of the duct, as it is probable that resolution of the inflammation is then far more likely to occur. The administration of a sialagogue and an aperient should also be entertained. If the disease progresses, it is most important not to wait for fluctuation before incising the region of the swelling, for in the most dangerous cases, in which the pus is most likely to burrow and to lead to serious trouble, it lies so deeply beneath the tense parotid fascia that fluctuation may not appear until it is too late. If symptoms progress, therefore, for four days, and the swelling increases and becomes œdematous, an **Incision** should be made, as also in cases in which the temperature becomes high and intermittent, whether fluctuation can be detected or not. A transverse incision should be made over the point of greatest prominence, having due regard to the situation of the branches of the facial nerve and Stenson's duct; the parotid fascia should be freely incised, and not opened by Hilton's method as usually recommended. The finger should be introduced into the abscess cavity as in an abscess of the breast, in order to break down the interlobular septa and to convert the various loculi of the abscess into one large cavity, which should then be drained. Otherwise, undrained loculi will continue to grow and to burrow, and a further operation may be called for, or burrowing may occur and lead to a fistula or other troubles.

REFERENCE.—¹*Lancet*, Oct. 21, 1905.

PEMPHIGUS. (*See also* DERMATITIS HERPETIFORMIS.)

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Cassaet and Michelau¹ describe an acute eruption coinciding with digestive and hepatic trouble, and febrile phenomena in two cases: cure resulted in both by stopping the chlorides in the diet. The authors consider that toxic infection is the most important factor, and prepares the soil for the retention of chlorides, and that this retention is responsible for the eruption of the bullæ.

REFERENCE.—¹*Arch. Gén. de Méd.* Jan. 16, 1906.

PERICARDIUM, Surgery of. (*See* HEART.)

PERINEPHRITIC ABSCESS.

E. Hurry Fenwick, F.R.C.S.

Guiteras¹, in a paper on perinephritic abscess read before the Chicago Medical Association, gave the following as the diagnosis of perinephritic abscess. The onset is the same as any other deep-seated suppuration: in acute cases, rigor, sweating, and fever, whilst in chronic cases mild fever is present. There are the usual signs of general malaise. The position of the patient is often quite characteristic. When he lies on his back, his thigh on the diseased side will not extend beyond an angle of 60° to 80°. In sitting, he rests on the opposite tuber ischii, so as to relax the psoas on the affected side. The local symptoms are dull, deep-seated pain under the twelfth rib which may shoot down in the thigh, hypogastrium, scrotum, penis, testes, and groin. In some cases there is a swelling in the loin, with redness and tension of the skin, but the lumbar tumour often does not appear until weeks after the onset of the suppuration. The first thing noticed on inspection is that the lumbar hollow on one side is replaced by a slight bulge, especially seen when the patient is standing. On palpation there is a diffuse ill-defined swelling, which does not feel like the kidney and cannot be moved by ballotement. Dullness is sometimes found on the right side continuous with the liver behind, and on the left with the spleen. Fluctuation is usually absent, as in a case reported by Morris, in which three quarts of pus were evacuated. He points out the importance of diagnosing, if possible, the source of the abscess.

The condition may be mistaken for lumbago, typhoid fever, malaria, nephralgia, Pott's disease, hip disease, psoas abscess, lumbar abscess, lumbar hernia, abscesses and cysts of the liver, appendicitis, renal injury with blood in the perineal tissue, renal tumour, hydronephrosis, pyonephrosis, parametritis, parovaritis, or ovarian cysts.

TREATMENT.—Open by **Lumbar Incision** from twelfth rib downwards along the outer border of erector spinæ. Explore the cavity with the finger to ascertain, if possible, the exact source of the pus. If the kidney be the source of the pus, the cavity can be drained, and the damaged kidney dealt with at a future operation. Free drainage must be established.

In summing up, he emphasizes the following conclusions:—

1. Many more cases of perinephritic abscess are due to suppurative renal disease than is generally supposed, a fact which has been proved by the rapid strides that have been made in renal surgery.

2. Traumatism, exposure, and similar influences to which primary perinephritis is attributed, are not so important as many observers have claimed. They are often vaguely given as causes, when they are simply coincidences. Traumatism may of course rupture already existing abscesses in the kidney or neighbouring structures.

3. It is important, though difficult, to determine the source and course of the pus. Therefore, before the operation, pus should be looked for in the common urine, and in the separate urine by the ureteral catheter. During the operation the surgeon should try to determine whether the kidney is the source, and if not, what tissue or organ is. It is equally important to discover the road taken by the pus, as it indicates where a counter-opening should be made, and the further treatment of the case for complications.

4. The elements of success in operations for perinephritic abscess may be summed up as follows :—

(a). Early incision and evacuation before the pus has had time to burrow extensively.

(b). Thorough exploration, without timidity, opening the kidney and exploring the ureter if need be.

(c). Thorough drainage down to the deepest part of the sac by means of soft rubber drains or gauze, the drain being kept in place until a well-formed sinus exists down to the deepest part of the cavity.

(d). Nephrotomy, nephrostomy, or nephrectomy should be performed if indicated at the time of the operation or later.

REFERENCE.—¹*New York Med. Jour.* Jan. 27, 1906.

PERIOSTITIS (Acute). (See ARTHRITIS, SEPTIC.)

PERITONITIS (General).

A. W. Mayo Robson, F.R.C.S.

In the *British Medical Journal*, December 18th, 1896, I reported a series of cases of appendicitis associated with general peritonitis, in which the removal of the diseased appendix and drainage of the abdomen, with or without saline flushing, was successful in five out of six cases occurring in my practice in that year. Since that time an extended experience of acute peritonitis from various causes has increased my conviction that, in advancing or in general peritonitis, though the prognosis is serious, it is by no means hopeless, and that operation should always be carried out as quickly as possible unless the patient is obviously moribund. The points in treatment that I would specially lay stress on are removal of the cause, free drainage, and rapidity of operation.

There is perhaps no question in modern surgery of greater interest and importance, and about which there is greater disagreement, than that of the treatment of diffuse peritonitis. The impracticability of freely draining the general peritoneal cavity, except for a few hours.

must be acknowledged, and though it does not appear to be obvious to all surgeons, the tendency in the practice of those who have carefully considered the question is on the whole tending less in the direction of prolonged draining than formerly.

Surgeons, in their attitude towards an extending or generalized peritonitis, may be put into four classes.

1. Those who do nothing in the way of operative interference, but simply keep the patient quiet and the stomach empty, until the inflammatory process and the exudates have become localized; and if the patient lives until this has taken place, then operate. The strongest advocate of this procedure is Ochsner, who reports unusual success in its employment.

2. Those who believe in immediate and radical surgical intervention, consisting in freely opening the peritoneal cavity, breaking up all adhesions, opening all pockets, eviscerating if necessary, and thoroughly irrigating the entire peritoneum. The mortality by this method is very serious.

3. Those who believe that the abdomen should be immediately opened, the cause of the inflammation sought for and quickly removed, and the abdomen thoroughly drained with the least possible disturbance of the viscera. Murphy has been the most ardent advocate of this method of treatment, and has lately gained for it, by his excellent results, a large number of adherents. He has recently reported 29 cases of diffuse or general peritonitis in which he had employed his method, with but one death, which was from pneumonia on the sixth day.

4. The fourth method consists in removal of the cause, and irrigation with saline fluid, without drainage.

The work of Clarke and Norris seems to show that saline solution within the peritoneum does not increase, but minimizes, the danger of pyogenic infections.

John H. Gibbon¹, in comparing the Ochsner and Murphy methods, says that in his own experience the operative treatment gives better results in children than in adults, and the non-operative is not as successful in children as in adults, because of the difficulty of performing gastric lavage and the difficulty in giving large quantities of salt solution by the rectum, and also because of the anatomical relations of the viscera in childhood, especially the shortness of the omentum, which does so much in adult life to localize the inflammatory process.

The treatment advocated by Murphy consists in making a small opening in the abdomen; closing the perforation, or removing the appendix, as the case may be; the introduction of a large drainage tube into the pelvis; placing the patient in a sitting posture of from thirty-five to forty-five degrees, and the administration of a quart of salt solution every two hours per rectum. This treatment is very simple, and yet it is practically everything that Murphy did in his 29 cases. He says, "It is a fatal mistake to mop, wash, or handle the intestines or peritoneum. Then, too, the simple opening of the

abdomen relieves the pressure under which the pus rests, and we know all that is necessary to stop absorption from a pus accumulation in any part of the body is to open the cavity and relieve the pressure. It is injurious and even dangerous to milk or handle an acute abscess; it is doubly so to handle an infected peritoneum, but the pressure should be relieved by opening it, allowing it to drain, and exposing the anaerobic flora to the air." Murphy has been so much impressed with the advantage of the sitting posture that he now has cases of peritonitis brought to the hospital in the ambulance, anæsthetized, placed on the table, and operated upon in this position.

It is remarkable how much salt solution is absorbed, and how it increases drainage and elimination by the kidneys. As high as eighteen pints of water may be administered by the rectum in twenty-four hours and all retained; this is only accomplished, however, by elevating the douche bag but eighteen inches above the bed and allowing the solution to flow into the bowel very slowly. The rectal tube can be kept in position from 24 to 48 hours, Murphy states, without inconvenience to the patient. It is his custom also to allow the administration of water by the mouth.

The experimental observations by W. B. Cannon and F. T. Murphy² on the motor activities of the alimentary canal after operation, as shown by the X rays after the administration of bismuth, demonstrated that arrest of peristalsis does not follow prolonged etherization. Exposure to air and cooling of the gut, likewise caused no noteworthy delay; but by far the most striking delay was seen after handling the digestive organs. Even with the most gentle handling within the peritoneal cavity, or under warm salt solution, no gastric peristalsis was seen, and no food left the stomach for three hours. Fingering gently in the air caused great retardation of the movements, while with rough handling in air no food passed from the stomach for four hours, and then it emerged very deliberately and was moved slowly onward with every evidence of extreme sluggishness of the intestine. This shows the value of the utmost gentleness in dealing with the viscera during operation, if arrested peristalsis is to be avoided.

A. W. W. Lea³ has an interesting article on the value of vaginal drainage in acute diffuse peritonitis in children.

Pneumococcic Peritonitis in Children.—W. F. Annand and W. H. Bowen⁴ contribute an interesting article on pneumococcic peritonitis, with reports of 16 cases. Their conclusions are as follows: (1) Pneumococcic peritonitis is a comparatively rare disease in children, but in the past, many cases have not been recognized. (2) It is, in about a third of the cases, secondary to some remote pneumococcal lesion; of these, affections of the lungs and pleuræ are by far the commonest, the middle ear being the next most common site. The infection is carried to the peritoneum in the blood-stream. (3) In the remaining two-thirds the peritoneum is probably infected from the bowel in the vast majority. No microscopic lesion is, as a rule, found. (4) In half the cases the pus is encysted; in these the diagnosis is fairly easy,

the prognosis is good, and the treatment is laparotomy and drainage. (5) In the other half of the cases, the peritonitis is diffuse, the diagnosis is very difficult, and the prognosis very gloomy. The treatment is laparotomy. (6) The pathological appearances are characteristic, and can be verified by the discovery of the specific organism.

Diffuse Peritonitis.—Charles A. Morton⁵ publishes a series of 14 cases of operation for diffuse peritonitis, which he distinguishes from general peritonitis, of which he reports 6 cases. He considers the difference to be important. By general peritonitis he means the condition in which the whole of the peritoneal cavity is involved. By diffuse peritonitis he means inflammation spreading widely in the lower abdomen, not merely suppuration localized around the appendix. Of the 14 cases of operation for diffuse peritonitis, treated by removal of the appendix and free drainage, 12 recovered. Of 6 cases with general peritonitis, in which the upper abdomen was involved, only 1 recovered. The lesson is obvious, for all the fatal cases could probably have been saved if operation in an earlier stage had been possible.

REFERENCES.—¹*New York Med. Jour.* April 7, 1906; ²*Ann. Surg.* April, 1906; ³*Med. Chron.* May, 1906; ⁴*Lancet*, June, 1906; ⁵*Brit. Med. Jour.* Jan. 13, 1906.

PERTUSSIS.

Prof. G. F. Still, M.D.

Whooping cough, according to Ager¹, is nearly always transmitted by personal contact, but there is evidence that occasionally it is carried by a third person or by clothing. He mentions as important diagnostic features, apart from the characteristic cough, the presence of an ulcer on the frænum linguæ, and the occurrence of a heavy white precipitate of uric acid in the urine. In some cases the child becomes much prostrated by the recurring cough, and falls into a stuporous condition, which is always to be regarded as an extremely grave symptom.

Parkinson² mentions the simulation of whooping cough by cases with signs of fibrosis of the lung, and says that in two such cases there was found to be enlargement of the bronchial glands lying in proximity to the bifurcation of the trachea and displacing the left vagus by pressure. The cough in these cases was not only paroxysmal, but attended by a whoop exactly resembling pertussis. A further difficulty in the diagnosis of whooping cough is often occasioned by the disappearance of the whoop when the disease is complicated by bronchopneumonia.

In the diagnosis of whooping cough in its early stage Churchill states that a differential leucocyte-count of the blood is very useful. Leucocytosis is present in nearly all cases, and in about 85 per cent there is a lymphocytosis at some period of the pertussis, especially in the early catarrhal stage, when infection is so apt to spread. If in this way any practical assistance can be obtained in deciding whether a child should be isolated or removed from school on account of suspected whooping cough, the blood-count may prove of much value.

TREATMENT.—Ager (loc. cit.) recommends that easily digestible food should be given, and the meals should be small in quantity (and

presumably frequently given), so that the child may have its food passed from the stomach into the intestine before the next paroxysm of cough causes regurgitation of the stomach contents. He also recommends the use of **Formalin Inhalations**, or small doses of **Apomorphine**. Young⁴ states that the vapour of **Eucalyptus**, **Carbolic Acid**, or **Compound Tincture of Benzoin** is useful, and advises that the nose and throat should be cleansed frequently with a spray of boric acid or salt solution, or with a solution of **Hydrogen Peroxide** in glycerin and water. Of antispasmodics he considers the most useful to be **Asafœtida**, **Antipyrin**, **Sodium Bromide**, and **Belladonna**, which should be tried in turn if necessary. **Cod-liver Oil** or **Iron Iodide** should be given at the same time if the patient is poorly nourished or anæmic. He says that the disease cannot be aborted; the most we can hope for is a lessening of the paroxysms.

Kraus⁵ recommends the inhalation either from an inhaler, or by diffusion through the atmosphere of the room, of a substance called **Vaporin**, which consists of naphthalin 180 parts, camphor 20 parts, eucalyptus oil 3 parts, and pine oil 3 parts; this is mixed with boiling water to vaporize it.

Rothschild⁶ reports the use of complete **Chloroform Narcosis** as a treatment for whooping cough in 9 children varying in age from two to seven years. In 2 cases the paroxysms never returned; in 4 they were much diminished next day and disappeared after four days; in 3 recovery occurred within a fortnight after the use of the chloroform narcosis. (It is not stated whether the narcosis was repeated.)

Berguete⁷, from a study of 300 cases of pertussis, concludes that whooping cough is scarcely influenced at all by any drug, but that the correct treatment is **Warm Baths** at a temperature of about 102° to 107° F., and repeated every six, eight, or twelve hours. In the early stage this treatment may abort the disease, and in the whooping stage it gives a mild character to it more effectually than does any other procedure. The treatment should be continued until the disease begins to subside; and for the treatment of symptoms it may be advisable to give **Terpinol**, **Belladonna**, **Ipecacuanha**, or **Euquinine**.

A simple method of treating whooping cough has been strongly advocated by Stephens⁸. Both **Ears** are **Syringed** with a warm **Boracic Solution**, and then **Painted** with a 5 to 10 per cent solution of **Cocaine** in glycerin and water. This syringing and the painting are repeated night and morning. Of 42 cases treated in this way, 33 were benefited, and in many of these the whoop ceased within 8 days after the commencement of treatment. In a series of 4 cases recorded by another observer, 1 was well within twelve days from the onset of the whooping cough; 2 others were able to return to school at the end of three weeks, which was within a month after the onset of the whooping cough, and their returning so early gave rise to no infection: the fourth case lost its whoop within two weeks. There are, however, certain cases in which the treatment is not effectual: (1) In children

of very nervous and irritable disposition; (2) During dentition; (3) In those suffering from any local inflammation in the neighbourhood of the Eustachian tube; but even in these groups of cases the treatment may bring relief to some extent.

Perhaps the most radical treatment which has yet been suggested for whooping cough, is by Atherton⁹, who recommends **Tracheotomy** in severe cases because he found that in a case in which laryngitis necessitated this operation the whooping cough present at the time was much relieved. He makes no mention of the tendency to bronchopneumonia in whooping cough, a risk which might be seriously increased by tracheotomy; and even apart from this, probably most parents would regard the remedy as worse than the disease, and would not unreasonably hold it responsible for the various respiratory complications which may arise.

REFERENCES.—¹*Brooklyn Med. Jour.* Nov. 1905, p. 415; ²*Pediatr.* Aug. 1906, p. 502; ³*Brit. Jour. Child. Dis.* Sept. 1906, p. 417; ⁴*Pediatr.* Sept. 1906, p. 583; ⁵*Deut. Med. Ztg.* 1905, p. 827; ⁶*Sem. Méd.* May 23, 1906; ⁷*Trans. Internat. Med. Congr.* 1906; ⁸*Hosp.* 1906; ⁹*Maritime Med. News.* Feb. 1906.

PHTHEIRIASIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Sabouraud¹, having noted the immediately fatal effect of **Xylol** on pediculi, applied it to this condition. As the pure xylol is too irritant, he uses equal parts of liqueur d'Hoffman and xylol (pure?) The parts are rubbed over with wool soaked in the mixture, and not only the pediculi but their ova are killed.

REFERENCE.—¹*La Clin.* Mar. 30, 1906.

PHTHISIS.

Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.

ETIOLOGY AND PATHOLOGY.—Rivers¹ gives an extensive collection of cases bearing on the points: "Physical build and mouth-breathing in their relation to pulmonary phthisis." In earlier communications he had stated "that deficient physique is an important predisposing cause of pulmonary phthisis, tending on the whole towards an alternative incidence to some others, chief of which are mouth-breathing and alcoholism." He summarizes his present points thus:—

The following reasons are advanced in favour of the view that an hereditary causal relation to pulmonary phthisis may be predicated of mouth-breathing and of deficient physique:

1. That both conditions prevailed to a much greater extent among consumptive males, quite independently of their disease, than among a comparable series of non-tuberculous men.

2. That whereas some causes of mouth-breathing, as also physical build, are known to be hereditary, a family history of phthisis is much more often given by those who are mouth-breathers or of deficient physique—whether they be healthy or phthisical—than by others.

3. That the physique-incidence of mouth-breathing in phthisical subjects probably differs from that in the non-tuberculous.

4. That consumptives of a naturally good height-weight ratio fall ill, on an average, at a later age than do others.

Calmette and Guérin's experiments² go to support Von Behring's view that tubercle passes freely through the intestinal tract, with or without leaving any traces behind, to infect the lungs and bronchial glands. But they differ from him in believing that this tendency is greater in the adult than in infancy. They show that bovine is more virulent than human, and human more than avian, tubercle. Vallée's work shows much the same results, viz., that when tubercle is introduced directly into the digestive tract, more marked lesions are found in the bronchial and mediastinal glands than in the intestinal mucosa or mesenteric glands. He thinks that the intestinal route is a common mode of infection in the human being, and regards it as significant that tubercle bacilli can travel from the intestine to the bronchial glands, and multiply there, without leaving any lesions in the organs through which they have passed, as the intestine, mesentery, liver, etc.

Koch³ is still of the opinion that bovine tuberculosis is but a small cause of tubercle in man. He thinks that the majority of cases of pulmonary tuberculosis spring from the inhalation of dried sputum. He points out that in many cases the lesion is "closed," and that no tubercle bacilli are being discharged in the sputum, whilst the most dangerous are those in which the lesion is "open," because they expectorate material full of bacilli. He emphasizes the facts that cleanliness, sunlight, and copious ventilation all act strongly towards preventing the spread of infection; he says: "The patient becomes dangerous only when he is personally uncleanly, or becomes so helpless in consequence of the far-advanced disease that he can no longer see to the suitable removal of the sputa. For the healthy, the danger of infection increases with the impossibility of avoiding the immediate neighbourhood of a dangerous patient, as in densely inhabited rooms, and quite specially if the latter are not only overcrowded but also badly ventilated and inadequately lighted."

Bacteriæmia in Pulmonary Tuberculosis.—Jochman⁴ gives the positive findings of many observers and the negative results of others. He regards the positive results as due to contaminations. His conclusion is "that a true bacteriæmia occurs only very rarely in pulmonary tuberculosis, even in late stages. To what extent the absorption of toxins from streptococcus and staphylococcus active in the old lung lesions may influence the temperature and general symptoms of the patient is another question."

Parkinson⁵, in an interesting paper, discusses the tissue metabolism of phthisis, albuminuria, and the thoracic indices. He claims that the respiratory capacity is lower than the normal average of 3.3 litres, and also than the average normal stature respiratory capacity of 20 cc. The pulmonary ventilation is increased over 80 per cent., carbonic acid over 64 per cent, total oxygen consumed over 70 per cent, and the oxygen absorbed by the tissues over 94 per cent.

SYMPTOMATOLOGY AND DIAGNOSIS.—The success of treatment has

been shown to depend so entirely upon early diagnosis, that this subject received much attention at the International Congress on Tuberculosis at Paris in October, 1905⁶. Achard relied on the build, general appearance, and family history. The temperature in phthisics was easily affected by exercise; little was to be learned from the urine. Respiratory exchange, as already reviewed, might become useful in future, but at present told little beyond the predisposition. Radiography showed obsolete and quiescent lesions difficult to recognize by other means. The cytodiagnosis helped in many pleuritic effusions of doubtful origin, but was not so reliable as bacteriological examination by means of inoculations and cultures. Examination by tuberculin, he thought, was open to objection. The agglutination test was not yet fully worked out. The physical examination of the chest must still be much used. Mariani mentioned many suggestive signs which should make one examine the patient most carefully, such as adenoids, intercostal neuralgia, herpes zoster, anæmia, dyspepsia, achlorhydria, hyperthyria, a constantly rapid pulse without a temperature, peculiar colour of gums, rise of temperature on fatigue, tendency to profuse sweating, dry cough, dyspnoea on exertion, hæmoptysis, and muscular atrophy, especially when noticed in the scapulothoracic and sternomastoid muscles. He thought percussion of little value, but that auscultation was very useful; the slightest modifications in the rhythm and pitch of the breath-sounds should be noted. Williams did not think radiography gave much more information than physical examination. He relied chiefly on the examination of the sputum for tubercle bacilli. Arthaud considered minute changes of percussion note important, also interrupted breath-sounds.

Many observers praised **Tuberculin** as a great aid in early diagnosis. It was pointed out by some that tuberculin could be used in a new and certainly less objectionable way if minimal doses of $\frac{1}{3}$ mgm in adults and $\frac{1}{10}$ mgm in children were employed, several times if necessary but not increased. While no harm whatever resulted from this method of using it, yet the "reactions" were as certainly obtained as when using the increasing doses. It was pointed out that the reaction was less common with old than with young subjects, and only took place when active processes were going on in the body; also that a positive reaction does not locate the disease in the lungs, for, of course, it may be anywhere in the body.

Labbé and Landouzy⁷ regard anæmia as a symptom-complex, frequently resulting from tuberculosis. The importance of not overlooking early phthisis in cases of chlorosis is emphasized, and instances are given where such patients also presented evidences of tuberculosis, or reacted to tuberculin. Many of these had a family or personal history of tuberculosis. The converse is also true, in that women, suffering with phthisis, frequently give a history of chlorosis at puberty. Incidentally it is pointed out that ochrodermia is not always associated with anæmia, and the presence of the former does not prove the latter, examination of the blood being the only sure test.

Temperature.—Galbraith^s shows that in tuberculous subjects the centres for heat production and dissipation are poisoned by toxins, are not so alive to the changes which are constantly occurring in the body under altered circumstances of rest and activity, gastro-intestinal metabolism, and other physiological processes; and, therefore, do not begin to act till the temperature of the body has risen above or fallen below the normal point. In other words the tubercle, or some other, toxin does not *cause* fever, but, more or less, paralyzes the centres which control the mechanism for the maintenance of normal temperature. He also gives some interesting types of temperature in tuberculous cases.

Of the intestinal type, in which the morning remission fails to occur, on account of intestinal fermentation, he says: This type is characterized by a raised mean about 99° Fahrenheit, with a diminished swing; the morning record rarely reaching the normal. There is usually widespread crepitation, with little consolidation and little sputum. It is invariably associated with marked gastro-intestinal symptoms,

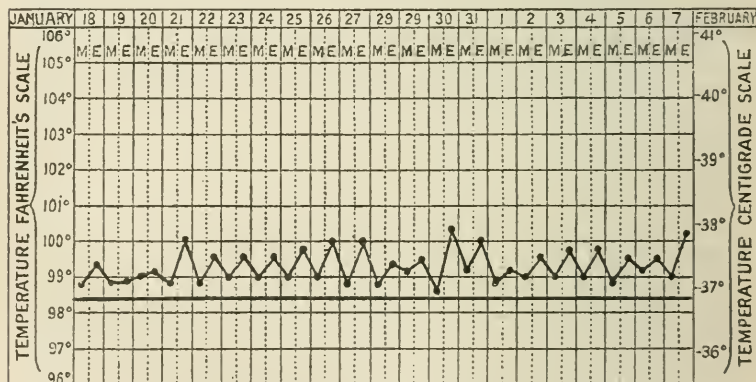


Fig. 56.—A temperature of the gastro-intestinal type.

fermentation, flatulence, and constipation or diarrhœa. For prognosis, this indicates a bad type of disease. Whether it is accompanied by actual tuberculous disease of the gastro-intestinal tract, I have not been able to verify, but it closely resembles the type of temperature found in avian tuberculosis. Fowl tuberculosis is almost invariably intestinal, with diarrhœa.

The deficiency of control may be exaggerated in cases with pre-existent nerve instability, causing the so-called hypohyperpyrexia, which is simply an exaggeration of the normal increased swing, the spasmodic action of the heat centres causing an exaggeration of the fall.

Frequently there is seen an inverted swing, which may be due to a raising of the morning temperature by intestinal toxæmia. An occasional inversion is frequently found in the gastro-intestinal type.

When the temperature is subnormal, inversion does not appear to adversely affect the prognosis.

Another cause of elevation of the mean temperature is septic poisoning, accompanying increased activity in, or disintegration of, a focus. This tends to be higher than the gastro-intestinal, and the swing is generally greater and more irregular. The physical signs are those characteristic of breaking down, and differ markedly from the former. In this type there may be a relationship between the excretion of albumose in the urine, and the mean height. It is difficult to estimate small traces of albumose, except by the rough indication got by the intensity of the reaction. It is present in minute quantities in all cases of cavity formation.

In conclusion he says: Clinical experience and the above researches show that temperature control in pulmonary tuberculosis is deficient from chronic toxic poisoning. The factors concerned in the production of the temperature perturbation are mixed infection and toxic absorption from the intestinal canal, or the local lesion.

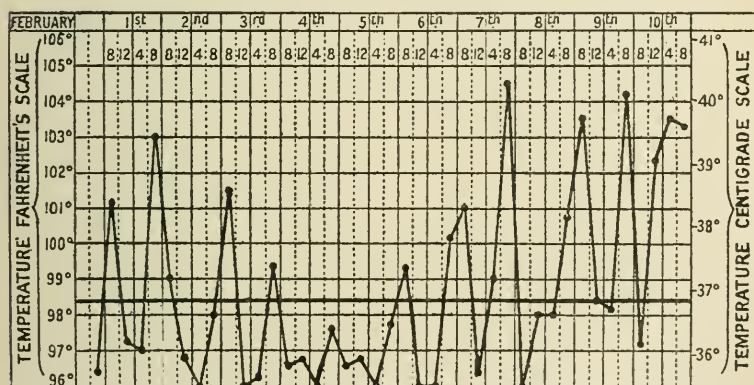


Fig. 57.—Tuberculous hypohyperpyrexia in a lunatic.

Hæmoptysis.—Lemoine⁹ criticizes the dictum of Laennec, Trousseau, and others, that at least half the cases of hæmoptysis were due to some other cause than tuberculosis, by pointing out that their opinion was based on the assumption that, as many of the patients did not subsequently develop definite signs of tuberculosis, they were therefore not tuberculous, whereas it is now well known that it is quite possible to be tuberculous without becoming phthisical. He regards nearly every case, however scanty and ephemeral, as due to tuberculosis. The present reviewer, whilst agreeing that the majority of cases are tuberculous, would point out that nearly all patients with chronic bronchitis will, from time to time, spit "streaks" of blood; and that, in districts like Australia, where hydatids are very common, they frequently affect the lungs and give rise to hæmoptysis, and other signs and symptoms very difficult to distinguish from tuberculosis.

We believe, however, that Lemoine's opinion, with the exception of chronic bronchitis, is substantially true for all European countries. He divides tuberculous hæmoptysis into three groups: (1) Pre-monitory, where the bleeding occurs as the first symptom and with practically no physical signs in the chest: (2) Congestive, where signs of phthisis can be detected; and (3) Terminal, due to ulcerative changes and cavity formation. Whilst agreeing that true, non-tuberculous, vicarious menstruation may occasionally occur, he considers that the majority of such cases is really due to a monthly flushing of a tuberculous area in the lung, the pulmonary affection having caused amenorrhœa *per vias naturales*.

TREATMENT.—There is but little to add, this year. What is known as the “Open-air” treatment still holds first place. Thought and work in this direction have been more turned to the larger question of prevention, the treatment of the disease as a whole, rather than that of the individual sufferer. There are, however, a few points worthy of note in the treatment of the individual or his symptoms. Several writers¹⁰ have advocated the treatment of the pulmonary lesion by compression, by means of the **Injection of Gas or Fluids** into the pleural cavity. If the apex is to be treated, gases, such as oxygen or sterilized air, are used, and salt solution and oil for basal lesions. It is held that immobility of the affected area should be maintained for three months, or longer, and that the injections can be repeated if necessary. These injections are made with a special needle and trocar. In criticism it may be pointed out that, if the object of the operation be achieved, nothing but good can result. By limiting the vascular and lymphatic flow to and from the diseased area, its nourishment will be lessened, and the absorption of poisonous toxins will be limited. In practice, however, it is commonly found that the pleural cavity in the immediate vicinity of the disease is obliterated by adhesions, and that therefore the injections compress more or less healthy lung outside the diseased area, though it is quite open to argument that, by thus rendering the whole lung practically immobile, the above-mentioned benefits are obtained.

In the treatment of hæmoptysis E. T. Smith¹¹ writes as to the absurdity of giving such drugs as adrenalin and ergot, which must contract the arterioles and so raise the general arterial pressure. He quotes Foxwell as saying: “Anything which keeps the blood in the systemic circulation, and so produces anæmia of the lungs, is beneficial. We know that the splanchnic area can contain all the blood in the body; any therapeusis, therefore, tending to fill this area must be good. Large doses of the **Nitrites**, which relax the systemic arterioles, should thus prove of service. Also, the vessel in the neighbourhood of the bleeding point is diseased, and its muscle fibres degenerated, and therefore the drug will act less upon them than upon the fibres of all the other arteries of the body: the injured arteriole it will not contract, but it will raise the pressure of the blood within it by its effect on all the healthy arterioles.” The writer recommends absolute **Rest** in

the recumbent position, mental quiet, **Morphia**, and the exhibition of the **Nitrites**, whereby the general arterial tension may be lowered; sodium nitrite, nitroglycerin, amyl nitrite; to which may be added the use of the **Hot Foot-Bath**, **Purging**, and **Venesection**.

At the International Congress on Tuberculosis held in Paris, many speakers discussed these points. Bielefeldt¹² held that compulsory insurance was a most important means, and showed how, in Germany, the insurance companies supplied practically all the funds necessary for the struggle, maintaining sanatoria, and so forth. He stated that the mortality from tuberculosis in towns of 100,000, or over, had dropped from 37·36 per 10,000 in 1886 to 22·0 in 1902. Garland¹³ did not think that the payment of a few more years' premiums, by a patient, would compensate insurance companies for the expense of treating such a case in a sanatorium. But for trades unions and friendly societies it was a different matter, as they had to grant "sick-pay" to the disabled, and probably the cost of arresting the disease would be less than the sick-pay. Already in England the "Foresters" and "Hearts of Oak" were joining a scheme for the establishment of sanatoria for their consumptive patients.

REFERENCES.—¹*Brit. Med. Jour.* Jan. 26, 1906; ²*Ibid.* Dec. 23, 1906; ³*Lancet*, May 25, 1906; ⁴*Deut. Arch. klin. Med.* 1905, Bd. lxxxiii, p. 558; ⁵*Pract.* Feb. 1906; ⁶*Lancet*, Oct. 21, 1905; ⁷*Ibid.* April 14, 1906; ⁸*Pract.* Feb. 1906; ⁹*Med. Press*, Aug. 8, 1906; ¹⁰*Sem. Méd.* April 11, 1906; ¹¹*Brit. Med. Jour.* April 21, 1906; ¹²*Lancet*, Oct. 21, 1905; ¹³*Ibid.*

PITUITARY BODY. (See DUCTLESS GLANDS.)

PITYRIASIS ROSEA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Douglas Montgomery¹ gives an account of 38 cases. He has compiled statistics of all their details, and found that they had lasted for periods varying from less than a week to twelve weeks before being seen. The "primitive" or herald "patch" he has never seen alone, and considers it the exception to find one, or even to get a history of its occurrence. The scrapings never showed any fungus on examination, and concurrent general disease was mostly absent. Out of the 38, 6 had distinct seborrhœa, which he considers suggests that those having seborrhœa are more prone to this disease. He finds the treatment first recommended by Allan Jamieson of **Condy's Fluid Baths**, followed by 3 to 5 per cent **Salicylic Acid** or **Vaseline**, most successful.

REFERENCE.—¹*Amer. Jour. Cutan. Dis.* April, 1906.

PITYRIASIS RUBRA PILARIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The case mentioned by Brault¹ occurred in a Jewess of thirty. The face was covered with a diffuse red rash, thin, glistening like a dry mask, and slightly scaly. The neck showed the characteristic small papules, feeling like a nutmeg-grater; the palms and soles were hyperkeratotic. The trunk, shoulders, and chest were covered with

a diffuse, slightly scaly redness, while the thighs, buttocks, and backs of hands also showed the papules.

TREATMENT by means of **Superfatted Soap**, **Alkaline Baths**, and ointments containing **Oil of Cade**, **Ichthyol**, and **Pyrogallol**, proved satisfactory.

REFERENCE.—¹*Gaz. d. Hôp.* Aug. 23, 1906.

PLAGUE.

J. W. W. Stephens, M.D.

W. B. Bannerman¹ contributes an interesting digest of many Indian reports of plague not easily accessible. He considers the evidence under a variety of headings, e.g., "spread from man to man directly," "spread by means of animals," "spread of infection by means of clothes," etc., etc., and concludes by saying how curiously most of them can be reconciled with the view that the flea plays an important part in conveying infection from rat to man in India.

J. A. Mitchell², after a full description of an outbreak of plague in Cape Colony, concludes that rats, directly or indirectly, were the means of introducing and spreading the disease. In this his results conform with the experience of most other countries except India, where human intercourse has been thought to be the chief factor in the transmission. Plague in man follows in the wake of a rodent epizootic.

The part played by rats in the dissemination of plague is now the subject of general investigation, and a number of special articles in the *Indian Medical Gazette* for July, 1906, deal with the various factors concerned, and largely with this factor of the rats.

Browning-Smith considers that the following facts may be considered as known: (1) That plague infection can be carried by fleas from an infected to a healthy rat (Liston, Gauthier); (2) That the flea can retain the plague bacillus alive and virulent from seven to eight days (Ziroglia); (3) That man is, in the large majority of instances, infected through the skin, though the breach of continuity is too small to be detected; (4) That the rat flea (*P. cheopis*), when deprived of its host, will attack man and animals other than the rat; (5) That the rat flea has been found on plague-stricken man and animals other than the rat.

Among a series of conclusions arrived at, we may mention the following: (1) That the actual definite epidemic is due almost altogether to the agency of the rat; (2) That the severity of the epizootic (among rats) depends on the extent of flea prevalence, and that a certain degree in this severity has to be reached before the plague epidemic will begin.

Gordon Tucker places the agencies by which plague is spread in the following order of importance: (1) Infected human new arrivals; (2) Infected clothing; (3) Infected merchandise; (4) Infected rats, living or dead.

T. S. Ross, on the contrary, is of the opinion (1) That the disease is hardly, if at all, directly infectious from one human being to another; (2) That clothing does not appear to play a great part in spreading

the disease ; (3) That rats appear to be the chief if not the only agent in disseminating the disease within limited areas.

Walker concludes (1) That as regards the spread of plague between man and rats, man acts as the carrier of the disease from one locality to the other, the rat as the manufacturer and distributor of the poison in that new area ; (2) That the chief means of infection of man is by means of the rat-flea.

Hossack finds that **Phenyl** in a strength of 1-500 (a couple of tablespoonfuls to a bucket of water) is an effective pulicide ; it paralyzes the flea in a few seconds, and kills it after having been in contact with it for about one minute. **Izal** is equally good.

In India, the four fleas commonly associated with man and rats are (1) The cat-flea, *P. felis v. serraticiceps*, small and dark ; (2) The human flea *P. irritans*, large and somewhat light coloured ; (3) The black-rat-flea of the black rat (*Mus rattus*), *P. cheopis*, small, light coloured ; (4) The brown-rat-flea of the brown rat (*Mus decumanus*), *Ceratophyllus fasciatus*.

It is of the greatest importance that the habits and distribution of fleas should be minutely investigated, for at present but little is known as to the part played by the flea in disseminating plague. Liston, who has so strongly advocated the flea theory, sums up his conclusions as follows : " Rat fleas can always be found in infected houses. These fleas will take to an animal which is not their normal host, and some of these fleas actually contain virulent plague bacilli (by placing guinea-pigs free from fleas in uninhabited but recently plague-infected houses, rat fleas can be collected out of their fur)."

The flea theory is then the one that holds the field at present, but it will be only when the habits of rats and their fleas are fully studied that we shall know how far it is true. The day after we had written this, the reports on plague investigations in India published in the *Journal of Hygiene*, vol. vi. No. 4, Sept. 1906, came to our notice. It is hardly too much to say that these reports represent some of the most important data on plague yet published. The whole report is worthy of careful study. We give a brief indication here of the nature of their contents in a summary of some of the results :—

1. Healthy rats have contracted plague from infected rats where the only apparent means of communication between the two was the rat-flea (*P. cheopis*).

2. In 21 experiments out of 38, 55 per cent healthy rats living in flea-proof cages have contracted plague after receiving fleas collected from rats either dead or dying of septicæmic plague. Consequently it is proved that the rat-flea, *P. cheopis*, can transmit plague from rat to rat.

3. Close contact of plague-infected animals with healthy animals, if fleas are excluded, does not give rise to an epizootic among the latter.

4. If fleas are present, then an epizootic once started spreads from animal to animal, the rate of progress being in direct proportion to the number of fleas present.

5. Guinea-pigs set free in plague-houses become infested with the rat-flea (*P. cheopis*), and become infected with plague in a certain percentage. The bubo is nearly always a cervical one, and apparently it is in this region of the body that fleas are most numerous.

6. Fleas caught on plague-infected rats in houses are able to infect healthy animals in flea-proof cages.

7. Guinea-pigs placed in plague houses do not contract plague if they are protected from fleas; unprotected guinea-pigs do so.

8. Guinea-pigs in cages placed in plague houses, but protected with a border of "sticky" paper 6 in. in radius, which the flea is unable to jump over, do not contract plague; unprotected guinea-pigs become infected.

The fleas of rats are as follows (Rotschild): On *Mus decumanus* (the brown sewer-rat), in Europe *Ceratophyllus fasciatus* is generally found. On *Mus musculus* (the house-mouse) *Ctenopsylla musculi*; this has no eyes, but has a comb of spines on the head and prothorax. The former species also occurs on the mouse, and this species also on rats. On *Mus rattus* (the black rat, the common rat of India) in Britain *C. fasciatus* has been found, but in Bombay 99 per cent of fleas on rats are *P. cheopis*.

Chronic Plague in Rats.—Out of about 2000 rats caught in certain villages in the Punjab in December, when neither human or rat plague, as far as was known, existed, five rats, apparently healthy, showed on post-mortem examination abscesses within the abdomen. Cultures proved that these abscesses were due to plague bacilli. Further, out of 32 rats that had been exposed to flea infection, two survived for twenty-two days, and when killed were apparently healthy, but, post mortem, abscesses were found due to plague bacilli.

Distribution of P. Cheopis.—In Genoa these were 40 per cent of the fleas of rats; in Sydney and Brisbane 80 to 90 per cent; in Marseilles 25 per cent; in Manila all rat-fleas examined were of this species; in Valparaiso large numbers were found on rats; in India the commonest rat flea was *C. fasciatus*, and *P. felis* also occur; Pretoria, present; Soudan, present; Cape Town, *C. fasciatus*. Except in Northern Central Europe, *P. cheopis* is the commonest rat-flea on house- and port-rats all over the world.

Pulex Cheopis.—The following is Rotschild's³ description: "This species is larger than *P. nubicus*, the palpus being shorter than the rostrum and not reaching to the end of the coxæ. In the male, sternites three to seven inclusive bear four bristles, while those of the female have five. The hind femur bears, in addition to the lateral series of hairs, two subventral bristles before the apex. The first segment of the mid-tarsus is rather less than two-thirds the length of the second, while that of the hind tarsus is about three-quarters as long again as the second segment. The long apical bristles of the second segment of the hind tarsus reach to the middle of the fifth segment in the ♂, and not quite so far in the ♀. The fourth segment is as in *P. nubicus*. The eighth sternite bears two long bristles

PLATE XI.

PULEX CHEOPIS.

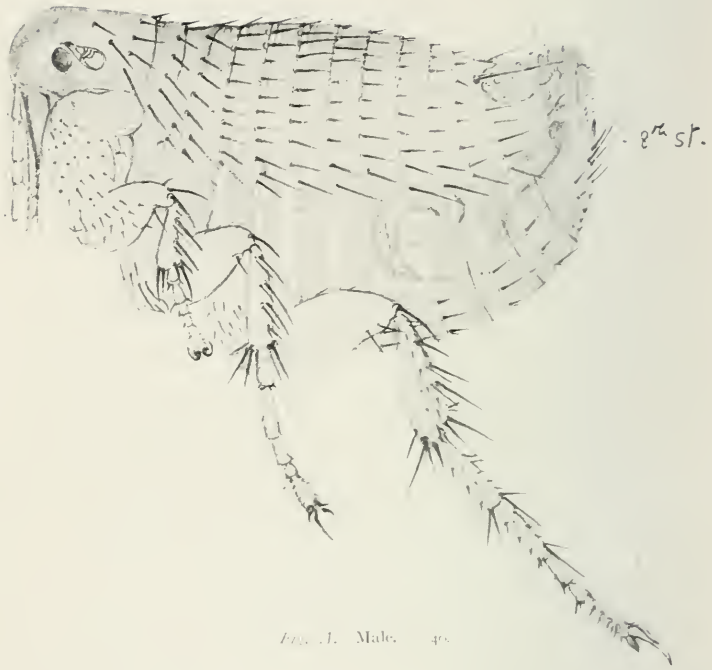


Fig. A. Male. 40x.



Fig. B. Anal extremity of male $\times 120$. *Py*, pygidium. *Ab*, anal bristles. *P*, penis. *Cl*, clasper. *CP*, second process of clasper. *S*, eighth tergite. *St*, ninth sternite.

before the end on each side, and numerous short ones besides. The anterior process of the clasper of the male (cl.) is compressed, being asymmetrical in shape. The upper or anterior edge is convex, bearing along this edge a number of rather long bristles. The second process (cl.) of the clasper is slender, with a few short hairs at its end. The ninth sternite (St.) gradually widens towards the apex. The plate of the penis (p) is curved upwards and pointed at the end. (See *Plate XI.*)

Greig⁴ has investigated the blood of patients in whom the duration of the disease had *not exceeded* three days. He finds that plague bacilli can be cultivated from the blood in over half the cases. Of these cases, 97 per cent proved fatal. The method employed by him was the following: 1 cc. of blood is taken from the elbow vein under anti-septic precautions, and added to 50 cc. of broth, with a little oil on the surface to aid stalactite formation; subcultures and animal experiments were then made in the usual way.

‡ **Haffkine's Plague Prophylactic.**—W. J. Simpson⁵ analyzes the data available for estimating the value of Haffkine's vaccine:—

	Uninoculated case mortality.	Inoculated case mortality
1897-1900	60.99	36.55
1900-1901	60.59	36.50
1901-1902	65.12	35.07
1902-1903	60.1	23.9

These figures prove the strong protection against death that the inoculated possess compared with the uninoculated. Other figures of an equally striking character are given.

Klein's New Plague Prophylactic.—Klein⁶ describes the mode of preparation of this vaccine, which he claims is devoid of the disadvantages of various other vaccines. The method consists in taking the affected organs of a guinea-pig dead of sub-acute plague (5 to 9 days) and drying them over sulphuric acid at 46-47° C. Thus, a guinea-pig of about 300 to 400 grams will yield 5.7 grams of dry powder from the bubo, spleen, lungs, and liver: 10 to 15 mgrams will protect a rat against the most virulent dose of plague. The prophylactic is kept dry in a stoppered bottle. For use, the required amount of powder is rubbed up in a mortar with sterile warm water about $\frac{1}{2}$ cc. 5.7 mgrams is taken to be the dose sufficient for a human being. It should be noted that the prophylactic itself is fatal to a certain percentage of rats. No plague bacilli, however, can be recovered from their organs.

P. Strong⁷ uses for producing immunity in man *living* avirulent **Cultures of B. Pestis.** It may be assumed that a plague culture which in a dose of two whole agar cultures does not kill a series of guinea-pigs, is sufficiently weak to be used for human inoculations. No plague culture should be used for this purpose unless this can be absolutely guaranteed. The inoculations are attended by no more unpleasant

results than is vaccination. The author has immunized 42 persons without any mishap. He commences with a dose of $\frac{1}{100}$ of a loop, and this is gradually increased until a whole agar culture is injected. As the method is innocuous it should be put to the test in a region where plague prevails.

C. Terni⁸, in the treatment of plague, advocates the **Extirpation of the Primary Bubo** as early as possible.

Skin Lesions in Plague.—C. França⁹ describes in detail the microscopical lesions in skin affections of plague. (1) In Oporto, in 1899, carbuncles were seen 11 times in 110 autopsies: of these, 7 appeared to be primary. França compares the appearances with those of an anthrax carbuncle. In anthrax the leucocyte infiltration is more general than in a plague pustule, and occurs not only in the skin but also in the adjacent connective tissue and muscle layers. In anthrax the œdema is more pronounced, producing constantly a zone of vesicles, which are frequently absent in plague. The bacilli in anthrax are far less widely spread than in plague. (2) *Pustules* were observed 6 times in 110 autopsies. They were in all cases secondary, i.e., some days after the fever and buboes. Macroscopically and microscopically they are completely identical with variola pustules. (3) *Pemphigus* only rarely occurs. Plague bacilli are present in the vesicles.

Giemsa¹⁰ describes a portable apparatus for producing poisonous gases for the destruction of rats. The material used is coke, and the gases produced, containing 5 per cent of poisonous carbonic oxide, are forced under pressure into such haunts of rats as native huts, cattle stalls, granaries, go-downs, etc. It is unnecessary to hermetically seal rooms, but holes are packed with shavings, sacking, etc. The rats do not escape, as they are paralyzed before the gases affect them unpleasantly. The apparatus is supplied by Messrs. Julius Pintsch (Berlin O., Andreasstrasse 72.)

REFERENCES.—¹*Jour. Hyg.* April, 1906; ²*Jour. R.A.M.C.* 1906, pp. 130, 291; ³*Entomologist's Monthly Mag.* 2nd ser. p. 85, plate I. figs 3, 9, plate II. figs. 12, 19, vol. xiv. 1903; ⁴*Jour. R.A.M.C.* vol. vii. No. 1, p. 35; ⁵*Pract.* Dec. 1906; ⁶*Ind. Pub. Health*, Mar. 1906; ⁷*Arch. f. Schiffs u. Trop. Hyg.* April, 1906; ⁸*Jour. Trop. Med.* Aug. 1906; ⁹*Zeits. f. Hyg. u. Inf. Krank.* 1905, p. 143; ¹⁰*Arch. f. Schiffs u. Trop. Hyg.* Feb. 1906.

PLEURISY AND EMPYEMA.

Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.

SIGNS AND SYMPTOMS.—Calvert¹, in a paper on the cause of *pulsating empyema*, reviews the literature on the subject. As long ago as 1776 Le Roy recognized the condition and said, "When the pus sac lies on the heart and large vessels in such a manner as to transmit their movements, there develop false impressions of an aneurysm." Traube thinks the pulsations due to a pericardial effusion associated with an empyema. Comby explained the pulsation by saying "When the lung is completely collapsed, pushed to one side, and adherent to the pericardium, it no longer resists the heart, the pulsations of which are then transmitted to the fluid in the pleural cavity, thence to the thoracic

wall." Ferrol says, "The pulsations are due to the presence of air." Skoda Gutbrod says, "In systole the heart has a right to left movement which may explain the pulsation." Kussmaul says, "When the pleural wall next the heart is thick enough to resist the impulse of the heart, the heart-beat is transmitted through the pleural wall to the fluid." Calvert's own explanation may be given in his own words:—

"The requirements are a firmly fixed, pulsating organ; contact of the pleural wall with this pulsating organ; distention of the pleural sac with fluid, air, or solid material; and collapsed condition of the lung. The first requirement is fulfilled by the thoracic aorta; the second, by the normal relationship of the pleural wall to thoracic aorta; the third, by presence of fluid, pus, or a combination of these with air, in the pleural cavity; and the fourth, by the collapsed condition of the lung in pleurisy and empyema. Until the lung is completely collapsed it naturally contains more or less air, consequently compressible and capable of absorbing, or compensating for, the impulse of the aorta. But in time a point is reached when, to further compress the lung, a pressure sufficient to further expand the thoracic wall, and more especially the intercostal spaces, is required. Now, the impulse of the aorta transmitted to the pleural effusion will further expand the intercostal spaces, or pulsation of the intercostal spaces is present.

"As this pulsation is purely hydraulic in principle, the nature of the fluid in the pleural cavity is of little or no importance. Consequently, in pleural effusions, pulsation is not a positive sign of empyema. In the literature at hand only three cases of pulsating pleurisy are recorded.

"When a part of the fluid is withdrawn, a cessation of pulsation has been recorded. The withdrawal of the fluid reduces the intrapleural pressure. The lung expands when its elasticity becomes greater than that of the thoracic wall. Consequently, the lung again absorbs the aortic pulsation.

"The majority of cases of pulsating empyema occur on the left side. Only a few cases in the right side are recorded. An examination of cross-sections of the thorax shows that the right parietal pleura may easily be pushed against the aorta so that its pulsations may be transmitted to fluid in the right pleural cavity."

It will be seen that Calvert credits the aorta as the sole cause, not mentioning the heart, which has been regarded by other observers as one of the chief causes of this phenomenon. The reviewer would also refer the reader to the remarks on this subject in the *Medical Annual* for 1904.

Greene² points out that up-and-down movements of the heart are normal during respiration, but that there is no lateral movement with healthy lungs and pleuræ. He regards lateral movement of the heart during respiration as a constant and important sign of unilateral pleural effusion. During *inspiration* the diaphragm descends and the

pericardium is tautened; the fluid falls with the lowered diaphragm. At the same time the raising of the ribs increases the lateral dimension of the thorax, whilst the sound lung expands, with the consequence that the displaced heart moves back to the *affected* side. During *expiration* all the movements are reversed. He has not seen any case of liquid pleural effusion in which there was no cardiac movement, and only one case where the heart moved laterally during respiration but where there was no pleural effusion.

COMPLICATIONS.—Oliver³ adds three more to the fatal cases of hæmorrhage after puncture or incision of the chest wall. It has long been known that this may occur without any wound of an intercostal artery or of the lung. He admits the difficulty of explaining its occurrence, and suggests the following possible causes: (1) Malnutrition of the pleural vessels; (2) Altered state of the blood in sepsis; (3) Effects of the sudden removal of the pressure of the effusion on the pleural vessels, allowing of general oozing.

TREATMENT.—It is becoming more common to **Tap Early** in pleural effusion, the balance of opinion now being that removal of fluid should be looked upon as a treatment of the condition rather than be reserved simply as a means of relieving distress and dyspnœa. Though this is true for idiopathic serous effusions, many authorities would delay thoracocentesis where the fluid overlies some acute (possibly softening) lung affection, and also in the case of young children, in whom effusions are usually very readily absorbed without interference.

Ewart and Murray⁴ report an interesting modification of the method of treatment advocated by Barr. In their case the effusion was removed by syphonage and replaced by aseptic air. The secondary effusion was treated by **Injecting** a solution of adrenalin into the effusion itself. Thus, five intraserosus injections of 10 min. of a solution of adrenalin (1-1000) were made, at intervals of a few days, for 11 days, with resulting complete absorption.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Nov. 1905; ²*Ibid.* Mar. 1906; ³*Lancet*, Mar. 31, 1906; ⁴*Brit. Med. Jour.* April 25, 1906.

PNEUMONIA.

Wilfred J. Hadley, M.D. F.R.C.S., F.R.C.P.

TYPES.—Nordman¹ speaks of "24-hour pneumonia" as that in which the fever drops in 24 to 48 hours, the local and general signs remaining. The maintenance of physical signs distinguishes this type from "ephemeral" or "abortive" pneumonia, where not only the fever and general signs, but also all local manifestations of the disease, disappear very rapidly. He regards it rather as of the "apyrexial" type, explaining that probably many of this class had fever before they came under observation, many cases of pneumonia not being seen during the first 24 hours. He thinks that it occurs most commonly in young and vigorous subjects, and that the prognosis is usually very good. The reviewer has seen most "apyrexial" cases in old and debilitated people, in whom the prognosis was decidedly grave, and would certainly regard these cases of "24-hour pneumonia"

as of quite a different type. Bechtold² is reported as finding this type of pneumonia in about 1 per cent of his cases, and regards the curtailment of the attack as due to a diminished virulence of the bacilli, or to the unusually rapid development of antitoxin by the patient.

A most uncommon case is reported by Bochenski and Gröbel³ of foetal pneumonia. A child born on the third day of its mother's pneumonia showed signs of pneumonia at birth; it died in eleven hours, and the necropsy showed acute catarrhal bronchitis, with confluent, hæmorrhagic, lobar pneumonia of both lungs. This was proved, histologically and culturally, to be due to the pneumococcus of Fraenkel. Portions of the lung were in the "grey hepatization" stage, showing that the disease originated before birth. The organism was also isolated from the mother's blood, and the authors think that it passed thence into the foetal circulation and so caused the pulmonary affection.

DIAGNOSIS.—Variot⁴ draws attention to the difficulty of diagnosis in cases occurring in children, because the signs and symptoms are so irregular. For instance, there may be no pain and no rigor; or the pain may be abdominal, giving rise to the suspicion of peritonitis or appendicitis. Vomiting is frequent, further leading one to an abdominal, rather than a pulmonary, diagnosis. There may be no dyspnœa; indeed, in many cases, the breathing is not much quickened; but in the bronchopneumonic form the breathing is very rapid and distressed. Again, there may be no cough early in the attack, though later, when the pleura becomes affected, it is often so distressing. The sputum, so characteristic a feature in the adult, is not seen. He recommends tickling the fauces to cause cough, and then swabbing the throat with a tampon, a measure which often reveals the characteristic "rusty" sputum. He mentions the meningitic, or eclamptic, form, with its marked resemblance to meningitis with coma. He emphasizes the fact that in many cases the most important symptoms are fever, gastric disturbance, and prostration, without any physical signs of disease in the chest. He regards percussion as the most important of all the methods of examination, and says that slight alterations in the *note* will show themselves "for days" before auscultation reveals anything abnormal.

COMPLICATIONS.—Goodall⁵ reports some cases of apical pneumonia with marked tachycardia. He thinks it is due to irritation of the accelerator fibres of the sympathetic by inflammatory products in the neck. In one case the autopsy showed inflammatory exudation into the glands of the neck, the peribronchial glands, and also into the tissues of the mediastinum, which might have caused pressure. He regards the prognosis as graver in such cases. The reviewer would point out that whilst this may be so in adults, on the other hand, apical pneumonia is almost the rule in children, is then attended by no tachycardia, and is not usually of graver import than the basal form.

Chatard⁶ gives the percentage of pericarditis in cases of pneumonia as 4.66 (31 in 665). His collection of cases shows that this complication

is rather more common in young adults ; that it increases the mortality enormously (his cases show a mortality of 93·5 per cent) ; that it was commoner with right-sided than with left-sided cases, which seems to point to its extension by the blood- or lymph-channels rather than by direct extension. It was frequently insidious or latent, not recognized during life. The treatment is very unsatisfactory and often useless, but as this may be due to the fact that the cases are overlooked until it is too late, he urges the importance of keeping a most careful watch on the heart in all patients with pneumonia, as vigorous treatment in the early stages might materially lower the high mortality.

TREATMENT.—Loomis⁷ reviews the present-day treatment of pneumonia by comparing the practice of the four largest hospitals in New York. The result is as follows: (1) *Cathartics*. Calomel and salines are a routine treatment at first, and repeated if necessary. (2) *Local applications*. Only used when the pain and distress are intense. **Flaxseed Poultices** most commonly, occasionally the **Ice-Poultice**. The pneumonia jacket is confined to children. (3) *Diet*. Exclusively, or principally, milk, egg-albumen, broths, and eggs are added at certain of the hospitals, and in one the patients are encouraged to drink large quantities of water. (4) *Fever*. The treatment of fever varies. "**Cold Packs**," or what is called the "anterior pack"—the patient is covered with a sheet only, which is kept sprinkled with water at the ordinary temperature. **Alcohol**; and tepid sponging is also used. The "tub-bath" is very seldom used—alcoholic and toxæmic cases occasionally being treated in this way. (5) *Cough*. **Codeine**, **Heroin**, and **Morphine**, seem fairly commonly in use for checking cough if distressing. (6) *Insomnia*. **Trional**, **Veronal**, and **Codeine** are relied upon. (7) *Pulmonary œdema*. Hypodermics of **Adrenalin**, 15 to 30 minims of 1-1000, given every 15 minutes for five doses. **Atropine**, $\frac{1}{100}$ gr., is also used. They **Cup the Chest** at two of the hospitals, and rely more upon increased stimulation. Oxygen is used only in cases of dyspnoea and cyanosis. (8) *Cardiac failure*. **Alcohol**, **Strychnine**, **Digitalis**. **Alcohol**, except in one hospital, is used as much as ever, and comes first. **Strychnine** is used when alcohol fails to hold the heart, especially in alcoholic patients and where there is any pulmonary œdema or cyanosis. **Digitalis** is less often used now, but two physicians use it freely where signs of heart-failure are present. Saline **Rectal Injections**, 8 oz. normal saline every 4 hours, are used at one hospital, with marked benefit.

In summing up, he makes three statements or conclusions: (1) Advocates **Morphia** (hypodermically) in the early stage, to lessen shock and pain. Later it is seldom needed, and must be used then with the greatest care; (2) Deprecates the use or abuse of **Alcohol**. "The ordinary cases certainly seem to me to do better without it. **Strychnine** gives much better results than alcohol with alcoholic patients"; (3) Deprecates "the promiscuous drugging which is still too prevalent."

The mortality, during this investigation, came out at 34·8 per cent to 40 per cent at these four hospitals.

REFERENCES.—¹*Gaz. d. Hôp.* June 16, 1906; ²*Med. Chron.* Feb. 1906; ³*Med. Press*, Jan. 18, 1906; ⁴*Ibid.* May 2, 1906; ⁵*Scot. Med. and Surg. Jour.* Mar. 1906; ⁶*Johns Hop. Hosp. Bull.* Oct. 1905; ⁷*Ther. Gaz.* Feb. 15 1906.

POLYCYTHÆMIA (Splenomegalic).

Robt. Hutchison, M.D.

This term has been applied in recent times to a group of cases which present as their chief clinical feature more or less enlargement of the spleen, along with an increase in the number of red cells in the blood. The patients have mostly been men in middle life, and the first subjective symptoms are usually indefinite and of gradual development, consisting in nervous manifestations, such as headaches, vertigo, weakness, and occasionally gastro-intestinal disturbances. In some instances pain and dragging in the left side, due to the splenic enlargement, have first attracted the patient's attention. Objectively, the most pronounced sign is cyanosis, accompanied often by some dilatation and tortuosity of superficial veins. Moderate albuminuria has been observed in most cases. The blood shows a great increase in number of the red cells, with a corresponding increase of hæmoglobin. A slight degree of polynuclear leucocytosis is frequent. The viscosity of the blood, in those cases in which it has been tested, has been found to be increased. The spleen has shown a greater or less degree of enlargement, but the heart, lungs, and liver have not been affected. Cases have been described very fully in this country by Parkes Weber¹, but as the disease is one of long duration, not much post-mortem evidence regarding it has yet been accumulated, and it is still uncertain whether it is really entitled to be regarded as a clinical "entity" with a constant pathology. A summary of our present knowledge of the subject will be found in *La Semaine Médicale*, No. 35, 1906.

In the course of the past year Begg and Bullmore² have reported another case of the condition occurring in a lady of forty-seven, who had a strong tuberculous inheritance through both parents. Since infancy she had suffered from attacks of vertigo, nausea, and vomiting, which of recent years had become less frequent as a result of treatment. Various other symptoms were present, including frequent epistaxis and a turbidity of the afternoon urine. Several months before coming under the authors' care she found a small lump projecting from beneath the left costal border; at the same time wasting, languor, and cyanosis began to be apparent, and she suffered from a right brachial neuritis. The abdominal swelling steadily grew to such an extent that it caused discomfort; it was found to consist of a uniform enlargement of the spleen reaching two inches below the level of the umbilicus. Cyanosis was marked, but heart and lungs were normal. The urine was heavily loaded with urates in the afternoon, but contained no other abnormal constituent. The pulse tension was on the high side, and the blood contained 6,850,000 red corpuscles per cmm.; these varied in size, shape, and staining reactions, and the specific gravity of the blood

was about 1052. Under treatment by mercurial inunction and full doses of quinine by the mouth, the spleen diminished in size and the general symptoms abated considerably.

An additional case which occurred in the London Hospital has been fully reported by the writer of this article and Dr. C. H. Miller³, for the clinical details of which the reader is referred to the original paper. The writers were fortunate in obtaining an autopsy in this case, which showed (1) A high degree of vascular congestion in all the internal organs; (2) The presence of large areas of thrombotic infarction in the spleen and brain; (3) The development of extreme fibrosis of the heart muscle; (4) Over-activity of the red-cell-forming tissue of the bone-marrow. The authors regard the latter as the primary cause of the group of symptoms, but have no suggestion to offer as to why the blood-forming capacity undergoes an increase. Very similar conclusions are drawn by Hans Hirschfeld, as the result of a post-mortem upon another case (*Med. Klin.* 1906, No. 23).

Prof. Köster⁴, in reporting an additional case, reviews the various theories which have been advanced as to the etiology of the group: and states that the view originally held that the enlargement of the spleen was due to massive tuberculosis, and that the bone-marrow took on a vicarious action, is certainly not true for all cases. He looks with favour on the hypothesis, first suggested by Türk, that a primary irritation of the erythroblastic tissue of the marrow, with functional over-activity, is the cause of the polycythæmia, the other changes being secondary in nature.

Reckzeh⁵, on the other hand, who has also reported cases, believes that venous stagnation plays an important part, for in one of his patients a tumour of the thymus and lungs had caused compression of the superior vena cava, with resulting cyanosis of the upper half of the body, polycythæmia, and splenic tumour. Lommel⁶ has also reported a case which resulted from obstruction of the portal vein.

So far, the only conclusion that can justly be drawn from the available evidence is that the etiology of this clinical group is not a constant one. We are not yet in a position to say definitely whether the changes in the blood and blood-forming organs are primary or secondary. Meanwhile we must go on accumulating post-mortem evidence.

REFERENCES.—¹*Med. Chir. Trans.* Vol. 88; ²*Edin. Med. Jour.* May, 1905 (Abst. in *Brit. Med. Jour. Epit.* Nov. 4, 1905); ³*Lancet*, Mar. 17, 1906; ⁴*Münch. med. Woch.* No. 22, 1906; ⁵Abst. in *Amer. Med.* Nov. 25, 1905; ⁶*Deut. Arch. f. klin. Med.*, Bd. 87, Hft. 3 and 4.

PORTAL PYÆMIA. (See PYLEPHLEBITIS.)

PREGNANCY.

Arthur E. Giles, M.D., B.Sc., F.R.C.S.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

The Pyelonephritis of Pregnancy.—Much interest has been manifested in this hitherto little noticed complication of pregnancy. The most exhaustive papers that have yet appeared are those of Cumston¹. The subject was first brought before the notice of the profession by

Reblaud, and since then a number of cases have been published by various clinicians both at home and abroad. Lohlein and Olshausen found that the ureters of women dying in labour were nearly always dilated. The right ureter suffers most in this condition, owing to the asymmetrical position of the uterus. As the uterus rises out of the pelvis, these ducts become compressed between it and the pelvic brim. Thus, the first stage is one of simple ureteral dilatation and moderate hydronephrosis. The actual organism has been proved in most cases to be the *B. coli communis*. How comes it that the organism finds its way into the dilated pelvis of the kidney? As Cumston points out, it has been shown that, after experimental ligation of the ureters, infection of the kidney pelvis can be produced by injections of various organisms. It seems probable that the condition of hydronephrosis having been produced by the pressure of the pregnant uterus, the colon bacillus, in some period of unusual virulence, makes its way, via the blood-stream, to the kidney from the intestine. In two cases gastro-intestinal symptoms preceded the onset of the kidney disorder.

The common period for the onset of the disease is the fifth or sixth month. The initiation of the attack is sudden, with much pain localized in the lumbar region. This pain, which may be intermittent, is due to the contractions of the pyelo-ureteric muscle induced by the over-distension. The urine soon shows pus. Cumston notes that, on account of the varying pressure of the uterus, this may be intermittent. Where periods during which healthy urine is passed alternate with others during which the urine contains pus, a unilateral disposition of the disease may be confidently diagnosed, since in these cases, so long as the diseased ureter is completely obstructed, normal urine from the healthy side will alone be present in the bladder. There is marked fever, and not infrequently chills or rigors. In the worst cases, death may occur.

The principal diagnosis is from cystitis. It may be distinguished from the vesical affection by the absence of marked pain and tenderness affecting the bladder, by the diffusion of the pus throughout the urine, and by the very slight frequency of urination associated with it. The loins should be carefully palpated.

The prognosis on the whole is good, the symptoms clearing up rapidly after delivery, or even disappearing before this is due. The present writer has lately seen a case of this kind.

The treatment should be at first expectant, such as a **Milk Diet, Urinary Antiseptics**, and so on. If the symptoms do not rapidly ameliorate, and in all cases in which the patient's condition is grave, the uterus should be emptied, preferably by some method of **Induction**. It is only very rarely, and when in spite of evacuation of the uterus the symptoms persist, that nephrotomy is called for.

Eclampsia.—A very important communication on this subject has been made by Liepmann.² He carried out experiments with the placenta of eclamptic patients. These were minced, dried, and powdered. A fine suspension in normal saline solution was made.

Injection of the suspension into the peritoneal cavity of rabbits was fatal almost uniformly. On the other hand, the injection of the juices of the placenta alone was not injurious. He infers, therefore, that the toxin, whatever its nature, is closely bound-up with the protoplasm of the placental cells. The toxin was destroyed rapidly by keeping the placental powder, and it was destroyed by shaking the powder up with toluol. Attempts to extract it by chemical means failed, but it can be removed by all precipitants of albumin.

The placenta appears to be more toxic in patients who have *had few fits* rather than in those that have had many. Liepmann infers, therefore, that the toxin *passes out* of the placenta in a ratio corresponding to the number of fits. He states that though albuminuria is pretty constantly associated with eclamptic fits, yet there is no relation between its amount and the severity of the fits. Of particular interest is the statement that toxic placental powder, when mixed with an emulsion of normal brain material, is innocuous. This observer believes that the toxic molecules must unite with the nervous tissue after the same manner as the fixation of tetanus toxins by nerve cells.

The statistics of Bumm's clinic are then utilized to show that immediate delivery by vaginal Cæsarean section has reduced the mortality *from 30 per cent to under 3 per cent*.

Saline infusion and venesection are praised, but sweating is deprecated because it tends to concentrate the toxin in the blood. This last observation appears so strictly logical in the light of our latter-day knowledge as to make one wonder how it has escaped notice before. This paper may be regarded as the last word up to the date of its publication on this important subject.

Zweifelf³ has proved that sarcolactic acid is regularly present in the blood and urine of eclamptics. Füh and Lockemann⁴ have isolated it from the cerebrospinal fluid removed by lumbar puncture from these patients. Longridge⁵ has recorded a case in which an attempt was made to alkalinize the blood by the administration of citrate of soda and saline venous infusion. Sugar in large quantities was also administered in order to increase the antitoxic power of the liver, which it is believed can only be exerted in the presence of glycogen.

Chorea Gravidarum.—French and Hicks⁶ have studied 29 consecutive cases of this grave complication. They find as a result of their investigations, that primiparous women are the most likely subjects of the disorder, and that there is a tendency for it to recur in successive pregnancies. Further, it may recur in a pregnancy several times distant from that in which it first made its appearance.

One very important observation made by these observers is specially to be recorded, viz., the relation that the degree of pyrexia present bears to the ultimate prognosis. Out of the 26 patients that recovered, none had temperatures exceeding 99° F., whilst in the fatal cases temperatures of 100° to 105° were present. They consider, therefore, that the presence of pyrexia of 100° F. or more should justify a grave prognosis.

As regards treatment, not every case is to be induced even when the movements are violent. On the other hand, where induction is postponed until pyrexia becomes marked, the outlook even after induction is bad. Ordinarily these patients should be treated in the same way as those in which pregnancy does not exist.

Mitral Stenosis and Pregnancy.—The same observers⁷ have also contributed an excellent paper on mitral stenosis and pregnancy. They come to the conclusion that the dangers of pregnancy in these cases have been overstated, and that many of them bear pregnancy, labour, and the puerperium as well as normal women. When heart failure supervenes, it frequently does so, not with the first pregnancy, but after several pregnancies. They do not think, therefore, that it is necessary to absolutely negative marriage, provided that good compensation exists. Whether the woman marry or not, it is very unlikely that old age will be reached.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Jan. 1906, and *Brit. Jour. Obst. and Gyn.* Oct. 1905; ²*Munch. med. Woch.* Dec. 19, 1905; ³*Arch. f. Gyn.* Bd. 72 and 74; ⁴*Cent. f. Gyn.* 1906, No. 2; ⁵*Brit. Jour. Obst. and Gyn.* Dec. 1905; ⁶*Pract.* Aug. 1906; ⁷*Brit. Jour. Obst. and Gyn.* Sept. 1906.

PREGNANCY (The Toxæmias of).

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Nutritional processes during normal pregnancy have received due attention in current medical literature, and their modern aspects are well summarized in a recent editorial in the *British Medical Journal*¹. The noteworthy increase of interest in these problems is attributable to several factors. Thus, a desire for more accurate knowledge of the normal processes themselves, the necessity of understanding more thoroughly certain pathological deviations from them, and a laudable curiosity with regard to the material from which the foetus is constructed, have all tended to stimulate investigation of the physiological phenomena of nutrition during and immediately after normal gestation.

Departures from the normal type of metabolism frequently give rise to evidences of auto-intoxication. Such have a wide range, and may vary from a mild indisposition, speedily clearing up, to a most severe toxic condition which terminates fatally. Between the extremes many gradations occur, and for practical purposes it is convenient to group these manifold metabolic derangements together under the head of *Toxæmias of Pregnancy*.

The various toxæmias agree in originating from some fault in a nutritional process, but further than this no unity may be claimed for them. Irregularities in the digestion and absorption of the food-stuffs may give rise to certain of these disorders, while others have an intimate relation with a deficiency in the elimination of their waste products from the body. A third source of toxæmia during pregnancy, probably the most important of all, has to do with the intricate changes taking place as the food is being utilized by the mother and the child. At many points, then, the opportunity of deviating from the normal

metabolic processes is offered, and in consequence the possibility of several types of auto-intoxication is apparent.

The complexity of the subject is further increased by the fact that totally different pathological conditions may be accompanied by identical clinical phenomena, such as fever, convulsions, coma, or albuminuria. From which it naturally follows that a helpful division of the toxæmias of pregnancy according to clinical manifestations is impossible. Any rational classification must be based upon autopsy findings, or the isolation during life of a specific poisonous principle. Clearly, the latter criterion is most to be desired, but thus far has not been established in any of the toxæmias.

Pathological studies have been more fruitful, and so far as possible the present-day classification must be arranged in accord with them. Opie² has lately accentuated the importance of the localization of liver necroses in relation to the zones of the lobule. Applying his deductions to the lesions in the toxæmias of pregnancy, it is possible to distinguish two types: one in which the degenerative process commences at the periphery, and the other in the centre of the lobule. These differences are so marked that they cannot escape the most superficial observer, and to our minds most effectively dispose of the contentions of Stone³, Ewing⁴, Macdonald⁵, and Strauss⁶, that all varieties of the toxæmias of pregnancy rest upon a common etiological basis.

In addition to the two types just mentioned there is a third group of toxæmias which presents no liver lesion, but apparently depends upon a renal insufficiency.

Besides these tolerably well defined pathological groups, a number of other conditions must be recognized whose clinical manifestations point to the possibility of some toxæmic origin. These cases vary greatly as to their symptomatology, but they are provisionally grouped together for the reason that we are entirely ignorant of their significance and causation.

The following *classification* makes no pretence to completeness, but is in accord with our pathological knowledge of the subject. With further research a more extended division will likely become possible. For the present we may recognize: (1) Toxæmic vomiting and acute yellow atrophy; (2) Nephritic toxæmia (uræmia); (3) Pre-eclamptic toxæmia and eclampsia; (4) Presumable toxæmias.

VOMITING OF PREGNANCY.

The frequency of all degrees of nausea and vomiting has recently been studied by Rudaux⁷, who finds it present in 42 per cent of all pregnancies, particularly in primiparæ. The time of day when the distress is most pronounced is variable. According to Gerst⁸, it occurs in the morning in 31 per cent, several times a day in 25 per cent, at irregular intervals in 21 per cent, and only after meals in 15 per cent of the cases.

The importance of distinguishing between instances where the

vomiting is distinctly due to the existence of pregnancy, and those in which it is the result of some extraneous, coincident disease, was first mentioned by Matthews Duncan⁹, who has defined these two conditions respectively as "vomiting of" and "vomiting in" pregnancy. This point has lately been emphasized by Williams¹⁰ and by Berkeley¹¹, and the latter condition is illustrated in the recent literature by cases of excessive vomiting in typhoid fever and carcinoma of the intestine where pregnancy co-existed.

The great majority of pregnant women who suffer from nausea and vomiting are not seriously ill and recover spontaneously after several weeks of discomfort. In not a few individuals, however, the condition becomes aggravated, threatens the patient's life, and under such circumstances is designated as *uncontrollable* or *pernicious*. Williams (loc. cit.) recognizes three groups of these cases, namely: (1) Reflex; (2) Neurotic; (3) Toxæmic.

The Reflex Group is composed of cases in which the symptoms are due to some abnormality in the generative tract, or possibly to over-distension of the uterus by the ovum. Thus, von Uhle¹² reports an instance in which an extremely acute antelexion of the uterus was found. The organ was replaced and maintained in good position by a proper pessary, whereupon the vomiting ceased.

Similarly, retroflexion may give rise to persistent hyperemesis, as in the case of Frank and Hunter¹³, where relief followed restoration of the uterus to its normal relations. These clinical results establish the possibility of a causal connection between abnormalities of the pelvic viscera and gastric irritation, though the path of the reflex is in doubt. The evidence at hand will not justify the conclusion of Müller¹⁴ that an over-stimulation of the solar ganglia or those in the cervix described by Freund is accountable for the vomiting.

The Neurotic Group includes the vast majority of instances of pernicious vomiting. A nervous temperament is usually evident in subjects of this type of the disease, and its predominance has suggested the name. However, the neurotic factor may be absent or concealed, and it is rather intended to emphasize that in this condition we deal with a functional, not an organic derangement.

No vital error in metabolism is to be noted here. The actual output of urine and its nitrogenous content may be diminished, though both these are readily explained by the small quantity of fluid and food ingested. The so-called "nitrogen division" presents a normal proportion of urea, uric acid, ammonia, and amido-acids. The occurrence of acetone and diacetic acid in these cases is not unusual, and may be explained by the inadequate amount of food which these patients consume. Their presence in the urine is never to be taken as an indication that the pregnancy may not proceed normally to term.

The **TREATMENT** in neurotic vomiting consists largely in **Mental Therapy**, and calls for considerable moral courage on the part of the physician. Full assurance of the correctness of his diagnosis is undoubtedly the first essential toward attaining a cure, for without

it he will fail to inspire the patient's confidence, which is so essential to the efficiency of whatever remedy he suggests. When possible the patient should be isolated from her family and friends, attended by a nurse with suitable qualifications, and gradually taught that she can conquer her trouble.

Electricity, Massage, and many medicinal agents have been lauded in the treatment of pernicious vomiting. Their value pertains to the neurotic group alone, and, indeed, any of them will prove efficient here if it be firmly impressed upon the woman that the proper measure is being used and will bring about her recovery. Whatever choice exists between various lines of treatment depends upon the personal equation of the individual, since the element of "suggestion" invariably plays an important rôle in the cure.

The Toxæmic Group is the only one which strictly falls within the scope of the toxæmias of pregnancy. The others have been considered for the sake of completeness and contrast.

The symptomatology in this group is not characteristic, and patients may appear equally ill with either neurotic or toxæmic vomiting. The ordinary analysis of the urine likewise fails to differentiate them. In both types we find a diminished daily output, with low nitrogen content. Albumin and casts are absent in the neurotic, and usually do not appear in the toxæmic variety until shortly before death.

More detailed study of the urine will furnish the clue by which the toxæmia may be detected. Williams (loc. cit.) has noted in these cases the presence of a high percentage of ammonia which is to be regarded as indication of serious organic involvement. He designates this factor the *ammonia co-efficient*.

The essential information is obtained by making separate, simultaneous analysis of the urine for the total nitrogen by the Kjeldahl method, and for the ammonia by any of the approved procedures. Having thus learned the quantity of nitrogen and the quantity of ammonia, we may determine by an obvious calculation the percentage of nitrogen eliminated as ammonia. In normal individuals the ammonia includes from 2 to 5 per cent of the urine nitrogen, and we find no change from this proportion in the neurotic vomiting, but in the toxæmic cases a larger percentage obtains. An ammonia co-efficient of 46 per cent has been observed, though it is usually lower, and from experience thus far it would seem that a rise above 10 per cent justifies the diagnosis of a toxæmia.

The disturbance in metabolism suggested by this increased percentage of ammonia is further accentuated by more extended analyses. Thus, the nitrogen division, in these cases, shows the percentage of urea markedly decreased, while the relative amount of amido-acids is increased. Crystals of leucin and tyrosin may be found on microscopic examination, though not constantly. Acetone, diacetic and oxybutyric acids have been reported in several instances, but are in no way pathognomonic of toxæmic vomiting, since they may occur in the neurotic variety.

Associated with the deranged metabolism is a definite and characteristic organic lesion, which consists in areas of fatty degeneration and necrosis in the liver, located at the centre of the lobule. The cell-death begins about the central vein, and is always most pronounced in that region. An extension of the process into the outer portion of the lobule usually occurs, and in severe cases leads to almost complete destruction of the liver parenchyma. In its inception, none the less, the process is always confined to the central zone.

The similarity of this picture to that occurring in acute yellow atrophy has recently been emphasized by Stone, Ewing, and Williams. A detailed account of the subject will be found in the monograph of the last, who has collected a number of cases from the literature since Matthews Duncan first pointed out the occurrence of this pathological lesion in a case of uncontrollable vomiting.

The importance of the topography of liver necroses, insisted upon by Opie, has a particular significance in connection with the toxæmias of pregnancy. His work has conclusively demonstrated the difference between the central necrosis of acute yellow atrophy and the characteristic lesion of eclampsia which originates in the portal spaces at the periphery of the lobule.

The prevalent confusion between these two conditions is in great measure due to the marked similarity which is sometimes met with in their clinical manifestations. Eclampsia, to be sure, has little in common with uncontrollable vomiting; but it must be remembered that the majority of instances of acute yellow atrophy occur in the last half of pregnancy, and frequently exhibit convulsions and coma. Under these circumstances a mistaken diagnosis is easily understood.

Royster and Granby¹⁵ have placed on record a case which illustrates this point. The patient was near term when albuminuria, convulsions, and coma supervened. The clinical diagnosis of eclampsia would have passed unchallenged, had not contradictory evidence been furnished at autopsy, when the liver presented the gross and microscopic appearance which is characteristic of acute yellow atrophy. The portal spaces were normal, and the peripheral zone of the lobule contained well-preserved gland cells, which, therefore, preclude the possibility of considering this a case of eclampsia.

The TREATMENT in toxæmic vomiting and in acute yellow atrophy consists in the immediate **Termination of Pregnancy**.

NEPHRITIC TOXÆMIA.

The obstetrician has to deal at times with renal derangements which have existed prior to conception, and, again, with others which have developed during the pregnancy, most often in consequence of it. For the differentiation of these one must depend largely on the history which is obtained from the patient. A helpful objective sign, Blacker¹⁶ suggests, may be found in ophthalmoscopic study of the eye-grounds, when evidence of previous retinal hæmorrhage will establish the pre-existence of an old renal lesion.

The two most prominent facts regarding *Chronic Nephritis* in connection with gestation are that toxic disturbances commonly arise in the first half of pregnancy and that they usually terminate in abortion.

Instances in which symptoms of auto-intoxication accompany successive pregnancies are probably dependent upon a chronic nephritis, as it is unusual for eclampsia to occur a second time in the same individual, whereas women with chronic Bright's disease frequently have serious symptoms of renal insufficiency with every pregnancy, although in apparent health during the intervals. Sheill's¹⁷ case in which uræmia developed twice in connection with pregnancy following the removal of one kidney for tuberculosis, would naturally fall in this category.

Acute Nephritis may occur during gestation as a result of any of the causes which bring it about in non-pregnant individuals, or it may be directly referable to the pregnancy itself.

The renal involvement may be so extreme as to become the independent cause of death. A number of cases are now on record where no other lesion was found at autopsy. Of especial interest among these is one case, very completely reported by Lloyd¹⁸, in which the clinical picture was identical with that obtaining in typical eclampsia, but the autopsy failed to reveal any pathological change in the liver. A profound, acute necrosis of the cortex of both kidneys was the only lesion present, thus permitting no other clinical diagnosis than uræmia.

The TREATMENT of nephritis during pregnancy has not been materially altered by any contribution to the subject during the past year. It remains the consensus of opinion that conservative measures should first be given trial, and in the event of their failure the induction of labour is advisable. Just when this radical step should be taken must be determined by the particular indications in each case. In general, however, it may be said that present sentiment favours an early sacrifice of the foetus rather than hazarding the life of the mother by undue delay.

Induction of labour by one of the slow methods, whenever possible, should be preferred to *accouchement forcé*, since rapid dilatation of the cervix is frequently attended by serious and even fatal complications.

PRE-ECLAMPTIC TOXÆMIA AND ECLAMPSIA.

Very rarely eclampsia develops without warning, but in the great majority of cases its approach is heralded by preliminary signs of an untoward nature. Unfortunately, these frequently fail to give any definite indication with regard to the possible appearance of convulsions and coma.

The classical picture in threatened eclampsia presents as its chief features headache, visual disturbances, œdema, epigastric pain, and albuminuria with casts. The same symptoms, however, may be accompanied by pathological lesions other than those of eclampsia, and in consequence cannot be considered specific in any sense. Uncertain as their etiological significance may be, their gravity is

none the less assured, for practical experience has taught us that they are uniformly serious, calling for prompt and vigorous action.

The TREATMENT of such conditions should, in the first place, be along conservative lines, unless the trouble has developed acutely and is so severe as to prohibit any delay. In this event, as well as in those cases where milder measures have proved inefficient, the pregnancy must be terminated.

When labour should be induced is often a most difficult question to decide. No single symptom can be considered a guide; all the evidence at our command, from laboratory analyses as well as bedside observation, must be taken into account in making the decision. Occasionally, after every aid to prognosis has been exhausted, a measure of uncertainty remains.

Eclampsia.—There is no fact relating to the disease so well established, and yet so much in need of emphasis, as its specific PATHOLOGY. This was demonstrated in 1893 by Schmorl, and his observations have received abundant confirmation. A great deal of the confusion in the current literature would have been avoided if this were more generally recognized. Eclampsia is a pathological entity, and no case of toxæmia is entitled to be diagnosed as such unless it exhibits focal necroses in the portal spaces of the liver.

Although these lesions in the liver are pathognomonic of eclampsia, other organic changes are generally noted, and of the greatest importance among them are marked evidences of renal irritation. At times a most extensive degeneration of the kidney occurs, as in Poter's case¹⁹. His contention, however, that a nephritis constitutes the anatomical basis of the disease, lacks both clinical and pathological support. On the one hand, women with chronic nephritis are not predisposed to eclampsia; and on the other, instances of this disease, very rarely, show either mild renal changes or none at all.

The frequency and prominence of renal changes in eclampsia are so well known to all that they admit of no question, and at present it is only the lack of a specific relation of these lesions to the disease which requires emphasis.

Placental alterations in eclampsia have been the subject of recent research by Colonna²⁰. In accord with former observers, he fails to note any purely characteristic lesion, and in some instances finds the organ entirely normal. He calls attention to the presence of an excessive number of syncytial buds in eclamptic placentas, and assigns to them a rôle in the causation of the disease, but without adequate proof.

The ETIOLOGY of eclampsia continues the object of painstaking investigation and arduous controversy, but remains unproved. Present-day contributions to the subject are along either biological or chemical lines. The biological theories attempt to solve the problem by making use of the modern conceptions of toxins and antitoxins in accord with the phenomena relating to anti-bodies, precipitins, agglutinins, or hæmolysins. The original excursion of Veit²¹

into this field resulted in the suggestion of a hypothetical poison originating in the foetal elements of the placenta which he termed syncytiotoxin. An equally imaginary antitoxin, syncytiolysin, was thereby necessitated for the normal progress of pregnancy, and the responsibility for its formation was placed upon the maternal tissues. Through its failure to neutralize the syncytiotoxin Veit would explain eclampsia.

The usual absence of the disease in conditions where an excessive quantity of syncytium occurs, as in hydatidiform mole; and a similar absence in cases of ruptured extra-uterine pregnancy, where nature performs Veit's original experiment by casting the placenta into the abdominal cavity, effectually disposed of this hypothesis. Whereupon Ascoli²² speculates, upon purely theoretical ground, that eclampsia may be due to an over-production of the neutralizing principle elaborated by the maternal organism.

Liepmann²³ has published several communications of late in support of his hypothesis of eclampsia (see p. 449).

Semb's²⁴ investigations have been concerned with the toxicity of the blood serum in eclampsia. The task he sets himself is the reconciliation of the discordant observations by previous workers in this field. To this end, he first immunizes animals against normal serum. On these he tests the effect of serum from eclamptic women. In general, he notes a fatal issue following the injection of eclamptic serum, but the resulting symptoms are not analogous to those of eclampsia, nor do the anatomical changes in these animals agree, as a rule, with each other, much less with those of the disease in question.

Along still other biological lines, Drenst²⁵ has sought the origin of eclampsia. He demonstrates an abnormal permeability of the placenta in this disease by injecting fluids into the umbilical vessels, and on this observation constructs the following hypothesis:—The porosity of the placenta permits the escape of foetal blood into the maternal circulation; agglutination of the foetal blood occurs, thus explaining the red-blood-cell thrombi, which are probably of fundamental importance in eclampsia.

Other biological hypotheses have been advanced, and modifications have been offered of those just enumerated. All of them have met with criticism, and, in consequence, an extensive polemical literature has grown up. The objections which have been raised are almost altogether on theoretical grounds, and, therefore, are less formidable than negative evidence with an experimental basis. On the other hand, confirmatory results must be awaited before acceptance of any of these hypotheses is possible. For the present the matter must be held *sub judice*.

The chemical investigations of late years have striven for a more minute knowledge of the constitution of the urine in eclampsia, in particular with regard to the relative distribution of the nitrogen among its various compounds. Some of the work has gone even further in an effort to identify the specific poison of the disease.

The most conspicuous studies along this line are those of Zweifel²⁶ and his pupils. Their experiments were begun with the preconceived idea that eclampsia was a metabolic disorder dependent upon a deficient oxidation of the proteid molecule and a consequent toxic nitrogenous compound. Zweifel considered there was reason to suspect sarcolactic acid as the possible offender, and undertook quantitative estimations of it in the urine. His analyses would seem to show its presence in excessive amounts in cases of eclampsia. The possibility of the lactic acid occurring as a result of the convulsive muscular movements naturally suggests itself, but Zweifel disposes of this contingency, to his own satisfaction at least, by failing to demonstrate it in cases of uræmia. The origin of the acid, according to Zweifel, is foetal; he finds it as a rule, though not without exception, in larger quantities in the blood of the umbilical cord than in the maternal circulation.

The acceptance of Zweifel's deductions must await verification from independent sources. His conclusion as to the specific relation of sarcolactic acid to eclampsia is unsupported, as yet, by other observers, though the existence of deficient proteid oxidation in the disease is attested by the work of Whitney²⁷, Ewing²⁸, and others.

The association of glycosuria and eclampsia has been noted several times in recent reports. Rendu²⁹ found sugar in the urine of a woman during the fifth month of pregnancy, but it soon disappeared. Six weeks later the urine was heavily laden with albumin, though the reaction for sugar was negative. The patient had a number of convulsions, from which she recovered spontaneously, and labour was not induced until three weeks later, when a macerated foetus was expelled.

Two other instances of glycosuria are recorded by Essenson³⁰. One of these had convulsions during and after labour, with 3.5 per cent sugar in the urine but no albumin. The second patient exhibited glycosuria and albuminuria simultaneously in the seventh month of pregnancy. After two weeks of observation the quantity of sugar increased from 1.5 per cent to 3 per cent, and labour set in with convulsions. Unfortunately, the autopsy findings are not given in either case, and the relation of these cases to eclampsia is left in doubt.

None of the *clinical manifestations* of eclampsia in our present state of knowledge warrant a positive diagnosis of the disease. The occurrence of convulsions and coma during pregnancy in association with diabetes, uræmia, acute yellow atrophy, epilepsy, and even hysteria, deprives us of laying any great stress upon these symptoms which were once thought pathognomonic, while, on the other hand, the very sign which has given the disease its name may be entirely wanting.

Eclampsia without convulsions is again brought to notice by the recent report of Esch³¹, who adds a case to those previously recorded. His patient, a primipara, was in coma twenty-four hours and died undelivered. Although no fit occurred in the course of the disease, the autopsy revealed typical focal necroses in the liver, and established the diagnosis of eclampsia.

Analogous instances of coma during pregnancy with simultaneous albuminuria, are reported by Binder³² and by Lobenstein³³. The patients recovered in both these cases, however, and cannot be certainly classified with that of Esch, for until some manifestation of the disease is known to occur constantly during life the clinical diagnosis must be made tentatively.

The **TREATMENT** of eclampsia is still the subject of much dispute. The question of primary importance relating to the immediate termination of pregnancy has been answered in both the affirmative and negative by the statistical reports of the past year. The weight of authority, however, is overwhelmingly in favour of **Rapid Delivery**. This view receives alike the endorsement of advocates of the chemical and of the biological origin of the disease.

Opposition proceeds from some who base their judgment on the clinical results obtained when the uterine contents are not disturbed. Thus, Harpe³⁴ reports 70 consecutive cases from the Dublin Rotunda occurring between 1892 and 1905. Labour was not induced in a single case. The therapeutic measures employed were **Hypodermics of Morphia**, as suggested by Veit, **Hot Packs**, **Infusions**, and **Venesection**. **Gastric Lavage** was practised in some instances, and a **Purgative** left in the stomach if the patient was unconscious. Considerable importance is attached to keeping the patient on her side in order to avoid aspiration of saliva and foreign material. Lung complications were not so frequent when this precaution was observed.

The mortality in this series was 16.9 per cent, which certainly compares favourably with statistics from other sources, though obviously room for improvement remains. Moreover, in dealing with a condition so variable in its severity, a larger number of cases is necessary to insure against a preponderance of mild types of the disease.

Lumbar Puncture has not fulfilled the hope that was originally felt for it, and cannot be regarded as a curative measure in the treatment of eclampsia. Thies³⁵ made use of it in 15 cases with a mortality of 42 per cent. Recovery followed its employment in Bond's³⁶ 2 cases, but other therapeutic agents were used simultaneously, and he is uncertain what credit, if any, should be assigned to the puncture. Temporary benefit is noticeable at times after drawing off the fluid, as evidenced by temperature, pulse, lengthening of the interval between convulsions, and decrease in the depth of the coma. Pollak³⁷ states, however, that these changes are not noted unless the treatment is employed quite early.

Thyroid Extract was administered to 41 cases by Strumer³⁸, although it was not the exclusive treatment, and consequently no positive argument may be advanced from his experience. Ten of his cases are open to doubt as instances of eclampsia, and among the remaining 31 women, 5 deaths occurred. Quite similar results are reported by Lobenstein³⁹ from the New York Lying-In Hospital, where the extract was used in 6 cases with 1 death. From such statistics it is clear that the action of the thyroid substance is not

specific in the cure of eclampsia. However, there is reason for believing that thyroid insufficiency is the cause of some toxæmias of pregnancy, and it may well be that future research will disclose the type in which thyroid therapy is indicated.

The **Parathyroid Treatment** has been suggested by Vassall⁴⁰, but the data he offers are too meagre to warrant any general conclusion.

Post-partum Eclampsia.—Since cessation of the convulsions and recovery from the coma do not always follow the emptying of the uterus, while in other cases they first appear after delivery, the need of energetic medicinal treatment in eclampsia is usually imperative. Liepmann⁴¹ deals exclusively with the therapy of post-partum eclampsia in one of his recent communications. He lays particular stress on the use of **Artificial Respiration** where the breathing is rapid and shallow, suggesting that the procedure be employed every half-hour. The object, here, is to promote the absorption of oxygen by the blood. **Venesection** is endorsed in selected cases, having great value in plethoric individuals with a full, bounding pulse. Narcotics should be dispensed with so far as possible. At times they are absolutely necessary, however, and under such circumstances, he finds that **Chloral** administered by the rectum proves the most satisfactory. As a diuretic, a mixture of **Diuretin**, **Digitalis**, and **Camphor** is recommended.

Infusions of **Physiological Salt Solution** are generally considered most helpful in stimulating the activity of the kidney, and thus eliminating the toxic material. Zweifel⁴² thinks their value greatly increased by the addition of an **Alkali** with a view to neutralizing the poison in the blood. Accordingly, he suggests an infusion fluid containing 5 grams of sodium bicarbonate and 5 grams of sodium chloride to the litre of water.

It should be mentioned that certain French writers⁴³ are urging objections to the routine employment of infusions. They regard them as especially harmful in acute nephritis with marked œdema, since the addition of more water and chloride to a circulation which is apparently overloaded with them may completely paralyze the already impaired organs of elimination. Their argument favours a more rational use of the infusion, based upon a study of the individual case with regard to the excretion of the chlorides.

PRESUMABLE TOXÆMIAS.

Everyone who practises obstetrics meets with conditions during pregnancy which are more readily accounted for by auto-intoxication than any other hypothesis, although their origin is uncertain. For example, it is most satisfactory with our present knowledge to regard the *psychic changes* in the pregnant woman as dependent upon alterations in her metabolism. And similarly, the rare cases of *neuritis* find the most plausible explanation in disturbed nutrition.

This view is given colour by the occasional association of these

conditions with definite toxæmias. Thus, in a case of vomiting where a profound metabolic derangement was demonstrated, we have observed typical signs of neuritis, and in not a few instances mental abnormalities have been apparent.

Skin eruptions, of other than a contagious character, are not uncommonly seen in connection with gestation, and in many instances are inexplicable, except as a manifestation of slight toxæmia. They would appear to be more frequent in the days shortly preceding or following labour, the period in which the maternal metabolism presents its most acute changes.

Salivation, hyperacidity of the gastric contents with its attending "heart-burn," and other evidences of alimentary disturbance, may likewise prove to be the result of metabolic errors.

Dirmoser⁴⁴ is inclined to assign great importance to the *intestinal tract* as a source of toxæmia during pregnancy, and the same view has been lately insisted upon by Sondean⁴⁵. In support of this contention both of them point to the frequent occurrence of indican, indol, skatol, and an increased amount of ethereal sulphates in the urine where clinical evidence of a toxæmia exists.

A very rare and most perplexing phenomenon met with in the puerperium, a short time after labour, is *coma without any change*, thus far demonstrable, *in the urine*. The duration of the symptom in those cases which have come under our personal observation has been variable, but it lasts, as a rule, for several days. At the end of this time recovery has occurred, and we are ignorant of the pathological change underlying the loss of consciousness. There is no other clinical manifestation worthy of note. Albumin and casts are absent. The urine is not reduced in quantity, and its nitrogenous contents is normal. The data at hand are quite inadequate to warrant any theory with regard to its nature, but the condition impresses one as being clearly toxæmic, and, in common with many others, offers a stimulus for further research.

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68 ; ⁴⁰*Rev. di Clin. Med.* 1905, Mar. 4 ; ⁴¹*Centr. f. Gyn.* 1906, xxx. 693-8 ;
⁴²*Münch. med. Woch.* 1906, liii. 297-9 ; ⁴³*Bull. Soc. d'Obst.* Nov. 1905 ;
⁴⁴*Wien. klin. Woch.* 1905, xvii. 77-82 ; ⁴⁵*Bull. Lying-in Hosp. New York*
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PROSTATE (Diseases of).

E. Hurry Fenwick, F.R.C.S.

The question of treatment of the enlarged prostate has occupied considerable space in literature during the past year, and it has aroused some fair criticism. This question takes two forms :—

1. As to what cases of hypertrophy of the prostate should be operated on, and what cases should be treated by other methods, and
2. If operation is decided upon, what operation should be performed, and if the prostate has to be removed, by what route should this be done.

Shoemaker¹, in an article on the galvanic and other treatments of the prostate, states that, while employing laxative medicines, diluent drinks, etc., "above all other means that I have found for the reduction of the gland, the **Galvanic Current** stands first." The galvanic current is applied by means of a prostatic electrolyzer introduced into the rectum. The negative pole of the battery must be connected to the electrolyzer before inserting it into the rectum, as the positive pole would harden the prostate. The battery should be one with wet cells, dry cells not giving a current of constant strength. The galvanic current has been his mainstay in the treatment of prostatitis.

On the other hand, many surgeons consider that operation is indicated early in the course of the disease. Sir William Thomson² states that nobody is too feeble or too advanced in years for the operation, and advises **Prostatectomy** if nocturnal distress is great, if recurrent attacks of retention are present, and in cases of severe hæmorrhage. Nicoll³ says that prostatectomy by enucleation constitutes the cure for senile hypertrophy of the organ, and that the cure is complete and permanent in a large majority of cases. With other surgeons he gives the mortality as between 5 and 10 per cent.

Meyer⁴ goes further than Thomson, and states that in all cases except when the patient can command every resource, the operation should be urgently advised as soon as the time has arrived when the catheter must be given into the hands of the patient himself for general use. In cases where there is fever and suppression of urine, he advises that the bladder should first be opened and drainage established, but no attempt made to enucleate the gland. If the patient survives, this can be done through the original incision on a future occasion. He considers that the use of the catheter should only be advised if operative interference of any kind is refused. Czerny⁵ indicates for operation all cases in which catheterization is difficult, and if local pain, urinary calculi, or cystitis are present. Schlesinger⁶ thinks that all cases without definite contra-indication should be operated upon, and he considers neither age, nor cystitis, nor even pyelitis, a contra-indication.

As regards the value of **Bottini's Galvano-cauterization** of the

prostate, some difference of opinion exists, and its use is chiefly advised by American surgeons. Meyer, after much experience, thinks this operation cannot in justice be denied a place among the operations at our disposal for the relief of prostatic hypertrophy. He thinks it should only be done in exceptional cases, such as refusal of the patient to undergo a cutting operation. Under these circumstances he advises Bottini's operation rather than resort to catheterization. The death-rate is about the same as that of prostatectomy, 5 to 7 per cent. He believes that Bottini's operation is preferable to enucleation in cases of advanced carcinoma of the prostate, and states that considerable relief often follows the operation. Czerny advises Bottini's operation in cases of small prostate with a well-marked median lobe, but Meyer thinks that this median lobe is a contra-indication to Bottini's operation.

Carl Beck⁷ thinks that Bottini's operation is indicated in certain cases, such as old, feeble men who were likely to die as the result of complete prostatectomy. Cases in which Bottini's operation has been done can have prostatectomy done later should the first operation fail to relieve, but in reporting a case in which this was done, Bangs⁸ found the prostate very difficult to remove on account of scarring.

As regards the route by which the prostate should be reached, considerable difference of opinion also exists. Sir William Thomson states that the suprapubic route is generally the best. Nicoll advises that the first step in the operation should always be a suprapubic cystotomy, as it admits of completion of diagnosis and the exclusion of calculus, carcinoma, and encysted abscess. The second step depends upon whether it is advisable to remove the prostatic urethra or not. If the prostatic urethra may be left, he advises submucous enucleation, which is done by a perineal Y incision, opening the capsule of the gland by a crucial incision, and removal of the prostate by digital manipulation, assisted by the fingers in the suprapubic wound. By this method the bladder is not opened from the perineum, the mucous membrane is left intact, and the hæmorrhage is slight. He, however, states that if the mucous membrane is removed it is rapidly reproduced.

Meyer thinks that each case should be considered on its own merits, and that the choice between the perineal and the suprapubic route is of little consequence. Suprapubic takes rather shorter time than the perineal, the average time being fifteen to twenty minutes; the average stay of the patients in hospital is three weeks, and the wound is closed on the twenty-fifth to the thirtieth day. In using the suprapubic route, he does not use the finger in the rectum to support the gland, but sometimes introduces all five fingers into the bladder, and uses both hands during the operation. Ventral hernia may follow the suprapubic route; the prostatic urethra cannot be retained intact in all cases. The suprapubic route, he thinks, is also more likely to leave the sexual power intact.

Loumeau⁹, and Nicholwich in the same journal, advise the suprapubic method. Czerny thinks that the perineal method favours drainage, and that the suprapubic route has slightly the higher mortality.

Pilcher¹⁰ thinks the best operation is free exposure by a suitable perineal incision. Schlesinger advises the suprapubic route, as it is technically the easier. Syms¹¹ advises perineal prostatectomy by a modification of the usual operation. Fuller¹², on the other hand, favours the suprapubic route, by which he has done 250 prostatectomies.

Andrews¹³ advises a new method of dealing with the obstruction of micturition caused by enlarged prostate. He states that prostatectomy is unsatisfactory, in that it causes many deaths, and that therefore it should only be done in selected cases. Cystotomy must always have a considerable death-rate, and it cannot be considered as free from danger as, for example, the radical cure of hernia. Enlargement of the prostate only causes obstruction to the urethra because the pelvic outlet is a narrow, bony, ligamentous triangle, which is too small for the senile hypertrophied prostate, and the organ, not being able to expand laterally or downwards, encroaches on the urethral canal. As the triangular ligament and the pelvic floor hold the bladder-neck and prostate immovable between the pubic bones, he cuts loose the gland from its pubic and lateral ligaments, and allows the overgrown mass to fall backwards into a wider space, and so **Relieves the Obstruction on the Urethra**. He claims (1) A lasting relief from the obstructive symptoms by an operation in which the bladder is not opened and by which the death-rate will be practically nil; (2) That the retroprostatic pouch is abolished, and the *bas-fond* becomes a true funnel, with its outlet at its lowest point; (3) There is great relief of rectal reflexes and spasm. He quotes no case in support of this operation.

As regards the complications of removal of the prostate, the following have been met with: Suppuration in the cave of Retzius, peritonitis, deposits of phosphates on the edge of the wound and on the mucous membrane of the bladder, epididymitis, rectovesical fistula, fistula into the colon, loss of sexual power, ventral hernia, urethroperineal fistula, incontinence of urine, phlebitis, stricture, and hæmorrhage into the bladder.

As regards loss of sexual power, Loumeau states the power of erection is usually lost; it may be retained. Even when power of erection is retained there may be no discharge of semen from the urethra. Suprapubic prostatectomy is more likely to be followed by retention of sexual power than perineal. Bangs, however, reports a case of a patient who retained sexual power after perineal prostatectomy.

Meyer, in discussing the use of the cystoscope in the diagnosis of enlarged prostate, states that, in those cases where the prostate can be felt enlarged per rectum, the use of the cystoscope is unnecessary when the prostate is to be removed by the suprapubic route. In perineal prostatectomy it is useful, to decide if the median lobe is enlarged, or if calculi are present. Cystoscopy should never be omitted before Bottini's operation. If symptoms are present, but nothing abnormal is felt by the rectum, cystoscopy is absolutely essential in the diagnosis of enlarged prostate. [The Editor is in full accord with

these opinions of Meyer anent cystoscopy in the diagnosis of enlarged prostate.]

Cancer of the Prostate.—Young¹⁴ reports six cases of unrecognized early carcinoma of the prostate. In none of these were the classical symptoms of pain and hæmaturia present. There was pain in only one case, and that was complicated by calculus, and none had hæmaturia. The clinical picture was like the so-called sclerotic prostatic hypertrophy. In all the cases, however, induration of the prostate was felt, and examination by the cystoscope showed very little intravesical hypertrophy. He describes the diagnosis of cancer in the prostate as follows :—

Onset: Frequency and difficulty in micturition, resembling the symptoms of hypertrophied prostate. The pain is slight, hæmaturia is rare. Later, pain is present in most cases, but not in all. It may occur in the bladder and radiate to the penis, perineum, rectum, thigh, testicle, hip, or groin. Out of 40 cases which he analyses, hæmaturia was present in 8. Retention of urine is common in the later stages, and residual urine was present in all. On rectal examination, the prostate in the majority of cases is felt enlarged and nodular; this was present in 17 out of the 40 cases. But the prostate may be soft. The induration is often of stony hardness, and extends up along the seminal vesicle. Cystoscopic examination shows involvement of the bladder wall, but a feature is the small amount of intravesicular prostatic enlargement. He thinks that carcinoma is more frequent than is usually supposed, it being present in 10 per cent of all cases of prostatic enlargement. It may occur as an isolated nodule in a benign growth; and he lays particular stress, in diagnosis, on the feeling of an area of induration in the prostate in a case presenting the symptoms of enlarged prostate, but on cystoscopic examination showing little evidence of intravesicular growth.

Partial operation he considers is of no value, but he has devised an operation which he has tried in four cases, and which he hopes may lead to definite cure, as he believes that the carcinoma remains local for a considerable time. The prostate is exposed by a V-shaped incision in the perineum; urethrotomy is done upon a grooved staff, a prostatic tractor introduced into the bladder, and the rectum separated from the prostatic capsule by blunt dissection. Digital examination is then made to discover the presence of induration, and if this is found the operation is proceeded with. The membranous urethra is divided, as are the puboprostatic ligaments, and the posterior surface of the vesiculæ seminales, with their covering fascia, freed by blunt dissection. The anterior surface of the bladder is then exposed, and an incision made across the neck of the bladder and the trigone 1 cm. in front of the ureteric orifices. The vasa are divided, and the neck of the bladder, the prostate, the vesicula seminalis, the prostatic urethra, and the surrounding fascia are removed. The remains of the bladder are sutured to the membranous urethra. His first case lived nine months after the operation, but had incontinence

of urine. The patient then had a calculus form in the bladder. An operation was done for its relief, but perineal abscess and extravasation of urine followed, and the patient died. A small recurrence was found along the left vas. The second patient died of pyelitis, but careful examination showed that the carcinoma had been entirely removed at the operation. The third case recovered, and has no incontinence of urine; but in the day, urination is imperative when the desire comes on. There was no recurrence four months after the operation. The fourth case also recovered, but with incontinence of urine. This last case was operated upon on May 16th, 1905.

Gardner¹⁵ gives an excellent description of carcinoma of the prostate, and criticizes Young's paper and operation. He quotes Albarran, that carcinoma frequently starts in benign adenoma, and that malignant growth is much more common than is believed. It occurs at the period of life when simple prostatic enlargement is common, but is frequently seen both at an earlier and a later date. As opposed to Young's views of the local character of the disease, he quotes Guyon, who, pointing out the extreme tendency to diffusion, gave the name of *cancer prostatico-pelvien diffus*, and advises against all operative interference. Guyon also states that cancer of the prostate shows a tendency to diffusion more accentuated than cancers of other organs. The glands are invaded early in a definite order: first the iliac, then the pelvic, and then the sacral, inguinal, subclavian, and the mesenteric glands. He agrees with Young that the vesiculæ seminales are frequently affected, and that the bladder is invaded somewhat later. Urethral invasion is not rare, and the ureters are involved early, leading to dilatation of the pelvis of the kidney and hydronephrosis. The rectum is often surrounded by the cancerous mass. Bony metastases are common, the perineum may also be the seat of secondary growths, and the iliac vessels are frequently invaded. He gives the early symptoms as those of simple hypertrophy, with certain peculiarities which ought to awake the attention of the surgeon and put him on the proper path. These are nocturnal frequency, pain on micturition and defæcation, hæmaturia, which is spontaneous, coming on without cause day or night. On cystoscopic examination, there is very little intravesical growth; the onset is, as a rule, insidious; later there is cystitis. Owing to the rapid invasion of the surrounding tissues and glands, radical operation is seldom likely to succeed when the disease can be definitely diagnosed.

Prostatic and Periprostatic Abscesses.—Alexander¹⁶ defines a prostatic abscess as a localized collection of pus within the capsule of the prostate, due to an infection extending from the urethra. It may be single or multiple. Periprostatic abscess is an extension of the infection of a prostatic abscess outside the capsule. The pus may be confined above the triangular ligament, or may extend into the perineum or ischiorectal fossa. The most common cause is an extension of an acute or chronic urethritis, usually due to the gonococcus, and he thinks that improper uses of injections and irrigations, and

ill-advised instrumental treatment of the urethra are often the exciting cause. Abscesses may also be due to tuberculous infection or to infection in malignant disease. It may be secondary to chronic hypertrophy of the prostate, and occurs especially in those who habitually use a catheter. Infection takes place through the ducts, and the abscess may be limited to a lobule or to one lobe of the prostate; occasionally both lobes may be affected simultaneously. The symptoms are: Pain and difficulty on micturition, straining to empty the bladder, or complete retention of urine. There is pain also on defæcation, and rectal tenesmus. The usual symptoms of sepsis are present.

Diagnosis is made by rectal examination, which should be combined with bimanual examination. The prostate is enlarged and tender; in some cases a soft spot or fluctuation may be present. The outline of the prostate is frequently obscured by œdema. The urine often contains more albumin than can be accounted for by the presence of pus. If no operation is done, the abscess frequently opens into the urethra, and this is often brought about by rectal examination, or by the passage of an instrument to relieve the retention of urine. Should this occur, there is a flow of pus from the meatus; pus also passes back into the bladder, and will appear at the end of micturition. If the opening is large, all the pus may be discharged, and the case be cured, but in many cases the opening is small, and internal fistula results, with a chronic gleet. The abscess may also extend between the rectum and the prostate, into the perineum, the ischiorectal fossa, and the cave of Retzius. The abscess may also burst both internally and externally, leading to a troublesome fistula.

TREATMENT is **Prompt Incision**, unless the abscess has already opened into the urethra, and in these cases incision is often necessary, or at any rate will hasten the cure. The choice of operation is: (1) Incision and drainage through the anterior wall of the rectum; (2) Mechanical opening of the abscess by means of a sound passed into the urethra; (3) Incision through the capsule and sheath, after exposing the posterior surfaces of the prostate by a curved prerectal incision; (4) Drainage through a median perineal incision.

The first two methods are only mentioned to be condemned. The third is the operation usually practised, but Alexander strongly advocates the fourth method. The patient is placed in the lithotomy position, the membranous urethra opened on a staff, and the prostatic urethra dilated and explored by the finger. A finger of the other hand is passed into the rectum, and the abscess is opened by tearing through the mucous membrane of the urethra with the finger. The cavity is explored, and its floor made level with the floor of the urethra; the opening in the urethral wall is enlarged sufficiently to ensure thorough drainage. Hæmorrhage may be severe. A large catheter is tied into the bladder, and the abscess cavity drained with tube and gauze.

Patients are out of bed at the end of the first week, and complete recovery is prompt; fistulæ are rare.

In cases of periprostatic abscess above the triangular ligament, the abscess cavity is opened and explored by the finger through the perineal incision. When the abscess has extended into the ischio-rectal fossa, an additional incision is necessary to drain this space.

REFERENCES.—¹*Med. Rec.* Aug. 1906; ²*Brit. Med. Jour.* July 14, 1906; ³*Ibid.* Aug. 11, 1906; ⁴*Med. Rec.* Oct. 7, 1905; ⁵*Centr. f. Chir.* 1905, No. 30, quoted in *Brit. Med. Jour.* Oct. 28, 1905; ⁶*Deut. med. Woch.* Oct. 12, 1905, quoted in *Brit. Med. Jour.* Nov. 25, 1905; ⁷*Med. Rec.* Oct. 10, 1905; ⁸*Ibid.* June 23, 1906; ⁹*Ann. d. Mal. d. Org. Gen.-Urin.* 1905, vol. ii., No. 12, quoted in *Ther. Gaz.* May 15, 1906; ¹⁰*Amer. Med.* Oct. 6, 1905; ¹¹*Med. Rec.* Oct. 1905; ¹²*Ibid.*; ¹³*Ann. Surg.* Dec. 1905; ¹⁴*Johns Hop. Hosp. Bull.* Oct. 1905; ¹⁵*Gaz. d. Hôp.* Sept. 8, 1906; ¹⁶*Ann. Surg.* Dec. 1905.

PRURITUS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

For investigating a case, Adamson¹ lays down the following rules: (1) Exclude scabies and pediculosis; (2) Search for evidences of disturbance of digestive functions; (3) Examine the chest and abdominal organs for organic visceral disease; (4) When necessary, examine the uterus and ovaries; (5) Search carefully for local trouble in pruritus ani and pruritus vulvæ.

In *senile pruritus*, with nothing but atrophy of the skin, he finds tincture of *Cannabis Indica* useful. 5 min. are given thrice daily well diluted in water, after food, and increased to 20 or 30 min. for each dose if necessary. In *pruritus ani*, 1 dr. of Calomel in 1 oz. of vaselin is very effective. For *pruritus vulvæ*, bathing with warm, freshly-made saturated Boracic Acid solution is recommended, and after drying, Zinc Ointment is applied freely. X Rays, 3 to 4 Holznecht units given every ten to fourteen days, is valuable in the last two conditions.

Toff² considers that the action of Anthrasol is essentially antipruritic, and more pleasant than tar, having none of its inconveniences. He uses it in alcoholic solution.

Carle³ praises Tumenol for its antiphlogistic, antiprurigenous, and keratoplastic action. It is not strong enough for lichen or psoriasis, but in prurigo and local pruritus it acts excellently, and all the more efficiently if there are no excoriations from scratching.

REFERENCES.—¹*Clin. Jour.* Jan. 18, 1906; ²*Monats. f. Prakt. Derm.* 1905, Bd. 40, No. 12; ³*Lyon. Méd.* Nov. 5, 1905.

PRURITUS ANI. (See ANUS).

PSORIASIS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Abraham¹, discussing the various theories of the etiology of this disease, states that the only points upon which everyone seems to agree are that there is hyperæmia of the vessels of the papillary and subpapillary layers of the corium and hyperplasia of the layers above that. His statistics show that the disease occurs more frequently among malès, and that it really begins in early life.

In treatment he does not know of any one drug which, given internally, can be regarded as specific, but he always treats any special diathesis, such as uric acid. Externally he generally gives a ten minutes' weak **Tar Bath** every day, and follows it by a copious **Inunction** with some **Tarry Ointment**. He puts 1 dr. of creolin to 6 gallons of water in the bath, and, especially on the hard indurated patches of the extensor surfaces, he rubs,

R	Creolin	3j-3ij	Lanolin	
	Acid Salicyl.	gr. x	Vaselin	āā ad 3j

When progress is slow he adds **Chrysarobin** 10-20 gr. In out-patients he rubs **Chrysarobin** in benzine into obstinate patches, and then paints with collodion. For the scalp he uses

R	Hydrarg. Ammon.	3j	Sapon. Moll.	
			Vaselin	āā 3j

with the addition sometimes of resorcin or tarry oil.

Nevins Hyde², in a paper read at the British Medical Association meeting in Toronto, says: "There are facts pointing unmistakably to the conclusion that psoriasis is an expression in the skin of the human body of its resentment against long-continued exclusion of light from the surface." He divides his address into various propositions in favour of this theory:—

1. Psoriasis is a disease that never affects the lower animals, whether these be feral or in a state of domestication, for the reason that the integument of such animals is very rarely screened from the light by artificial covering.

2. There is a special sensitiveness of skin only in a certain number of people, these being a small minority.

3. It should be worst at those seasons of the year, and in those countries, where sunlight is less abundant. Thus it is worse in winter, when also thicker clothing is worn which excludes more light, and it is worse in temperate and cold climates than in the tropics; and negroes are scarcely affected.

4. It is worst in parts that naturally would get more light if the body were naked—scalp, back, elbows, knees, and backs of hands. He mentions the fact that in Christ's Hospital in London, where hats are not worn, few cases have arisen, but he rather weakens this argument by the statement that the scalp has only been affected along with the body.

5. If the above propositions are correct, the effective treatment should be illumination of the regions chiefly involved, and he has for the last ten years treated cases successfully by **Exposure to Daylight** for several hours daily in a warm room. He advocates the establishment of solaria.

Ross, in the discussion of Hyde's paper, referred to seven or eight cases under his care. The patients were all coal-miners, and none of them had any symptom of psoriasis before commencing that occupation. Fox and Corlett agreed that they had never seen psoriasis in negroes.

Duhring and Bulkley could not accept Hyde's theory, and assigned the cause to some disturbance of the internal economy.

Von Düring³ believes in vegetable and milk diet, and hydrotherapy. In inflamed cases he uses **Bran Baths**, in others **Green Soap**, **Carbonate of Potash**, etc., followed by a **Needle Douche** and rest in bed. In indolent cases he soaks the patient in grease for two or three hours before the bath. **Tar** and **Chrysarobin** ointments are then used; he prefers the former.

Gaucher⁴ advises the following ointment:—

R	Oil of Cade	10 parts	White Vaseline	30 parts
	Oxide of Zinc	20 parts		

Balzer and Deshayes⁵ use 5 per cent **Oil of Cade** in a special excipient called **Diadermine**, which is simply a soft soap with glycerin, neutral in reaction and easily washed off.

Schmidt⁶, discussing the **X-ray** treatment of this disease, states that in no case should erythema be produced, lest a fresh eruption result. The effects should show in a few days, and are evidenced by stoppage of scale formation, and diminution of the infiltration. The lesions should be gone in ten days. The treatment is specially indicated in inveterate single plaques, psoriasis of the hands, and diffuse infiltrations affecting large areas. Two cases in which rodent ulcer developed on psoriasis patches have recently been recorded by Whitfield and Percy Sargent⁷.

REFERENCES.—¹*Brit. Med. Jour.* April 14, 1906; ²*Ibid.* Oct. 6, 1906; ³*Deut. med. Woch.* 1905, No. 51; ⁴*Jour. Mal. Cut. et Syph.* April, 1906; ⁵*Bull. de la Soc. de Derm.* 1906, No. 1, p. 24; ⁶*Zeits. f. Diat. u. Phys. Ther.* June, 1906; ⁷*Brit. Med. Jour.* Jan. 1906.

PUERPERAL FEVER. (*See next article, also SERUM-THERAPEUTICS.*)

PUERPERIUM, THE.

Arthur E. Giles, M.D., B.Sc., F.R.C.S.
Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

Puerperal Infection.—Although no exhaustive contribution to the bacteriology of puerperal fever has been made during the past year, several interesting communications have appeared dealing with special cases. Bellingham Smith and Spriggs¹ record a case of primary pneumococcic infection of the uterus. The symptoms, which began on the fourth day, were very severe, and terminated in death. Pneumococci were recovered from the blood and pericardial fluid of the patient in pure culture. These cases, of which at present only a few have been recorded, are of much interest.

Knyvett Gordon² has reported a case of pure infection of the uterus by the *Bacillus coli communis* in which a **Coli Antiserum** prepared by Messrs. Burroughs and Wellcome had a most beneficial influence. We look upon the application of this serum as being a great step in the treatment of puerperal fever. One of us (V. B.), in collaboration with Foulerton³, published in 1905 the results of an investigation into the bacteriology of puerperal infections. It there appeared that in patients dying from this cause, by far the most frequent content of

the septic uterus was a combination of the *Streptococcus pyogenes* and the *Bacillus coli communis*, the latter organism being apparently a secondary infection. In view of this fact, the frequent failure of antistreptococcic serum when given late in a case appears logical. It was then the present writer's opinion (V. B.) that until a satisfactory anticoli serum was available with which to combine the antistreptococcic serum, the serotherapy of these late cases would be unsatisfactory. Knyvett Gordon's very interesting case gives reason to hope that such a serum is now on the market. We are therefore of opinion that the proper treatment of these cases is by means of these two sera in conjunction. They should be given empirically, pending a bacteriological diagnosis. When this is obtained, their continued use in conjunction may or may not be indicated. But since in practically all fatal cases the colon bacillus sooner or later invades the uterus, the use of an anticoli serum should be combined with whatever other serum the bacteriological investigation may indicate.

A great deal of literature has appeared dealing with operative interference in puerperal sepsis. Leopold⁴ has discussed the advisability of **Early Operation** in various forms of puerperal peritonitis and pyæmia. He has grouped these affections as follows: (1) General peritonitis; (2) Purulent phlebitis of the veins of the mesometrium; (3) Adnexal inflammations; (4) Local pelvic abscess. He considers that in all these conditions operative measures may be properly indicated. In the first group, drainage of the peritoneum should be established both through the vagina and by hypochondriac incisions. In the second, ligation of the thrombosed veins should be undertaken. In the third and fourth groups, drainage, with or without removal of the adnexa as circumstances may dictate, is indicated.

Cuff⁵ has published a very striking case in which **Ligation of the Broad Ligament Veins** effected a sudden and marked disappearance of symptoms and fever so severe as to leave no doubt that the recovery in this case was due to the operation. One of the leading advocates of this operation in cases of puerperal cellulitis is Bumm. Speaking on this subject⁶, he pointed out that the operation was first performed, unsuccessfully, by Freund, and later by Trendelenburg, who, after several failures eventually achieved a success. He himself had at first been unsuccessful, but latterly his results had encouraged him to adopt this measure in several cases. He ligatured the ovarian and hypogastric veins on one or both sides, as occasion demanded. Trendelenburg⁷ has compared puerperal pyæmia with that occurring in connection with middle-ear disease and lateral sinus thrombosis. Both conditions are due to a thrombophlebitis. He believes ligation of the broad ligament veins to be as rightly indicated in puerperal fever as the ligation of the internal jugular in lateral sinus thrombosis, and he considers that this simpler operation will replace hysterectomy in these cases.

On the other hand, several successful cases are reported in which the uterus was removed for puerperal infection, and useful papers on

this subject have been written by Haig Ferguson⁸, Vertes⁹, Lop¹⁰, and Cragin¹¹.

Although many successful cases of operative interference in puerperal sepsis are now recorded, it may be pointed out that the mere fact of certain patients having recovered does not establish the advantages of this mode of treatment, since the possibility that they would have recovered without the operation cannot be excluded.

The writers themselves consider that the advantages of these operations over therapeutic measures are not yet established. Where the infection is already generalized, the removal of the uterus is not sufficient, whilst on the other hand, in those cases in which the infection is strictly localized, there is a good prospect that the patient will recover by her own powers, especially when aided by suitable serum-therapy. Of the two operative measures principally advocated, they consider that the ligation of the pelvic veins is in every way superior to hysterectomy, but in the light of present experience the cases suitable for this procedure are not common.

REFERENCES.—¹*Brit. Med. Jour.* June, 1906; ²*Lancet*, Feb. 1906; ³*Trans. Obst. Soc.* vol. xlvii. 1905; ⁴*Arch. f. Gyn.* Bd. lxxviii. Hft. 1; ⁵*Brit. Jour. Obst. and Gyn.* May, 1906; ⁶*Med. Press.* Oct, 1905; ⁷*Jour. Amer. Med. Assoc.* July, 1906; ⁸*Edin. Med. Jour.* April, 1906; ⁹*Monats. f. Geb. u. Gyn.* Feb. 1906; ¹⁰*Gaz. d. Hôp.* Feb. 1906; ¹¹*Amer. Jour. Obst. and Dis. Women and Children*, June, 1906.

PURPURA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Although only a symptom of some internal derangement, this condition is always interesting from a skin point of view. Longley's¹ case of Henoch's variety illustrates once again the undoubted value of **Adrenalin**. The patient, a girl of eleven, who had suffered from various tuberculous joint lesions, developed the rash, chiefly on her legs, ten days after a soaking. It was accompanied by joint pains and a slight temperature, but two days after she felt much better. Four days later, vomiting and abdominal pain set in, the child evidently collapsing. Morphine suppositories, however, relieved matters somewhat, and she was able to take milk and soda, and was given bismuth and chlorodyne medicinally. On and off for three weeks the condition persisted, abdominal symptoms being worse when the skin rash abated. At the end of this time a more severe attack, complicated with hæmaturia, occurred, morphine suppositories doing no good. Adrenalin 2 min., liq. arsenicalis 3 min., were given four-hourly, and acted like a charm.

REFERENCE.—¹*Brit. Med. Jour.* April 14, 1906.

PURU. (See YAWS.)

PYLEPHLEBITIS.

Robt. Hutchison, M.D.

In an important statistical paper¹ on portal pyæmia and pylephlebitis, based on the post-mortem records at St. Bartholomew's, Dr. W. Langdon Brown comes to the following conclusions:—

1. A collection of pus within the portal zone is the principal cause of portal pyæmia. Ulceration of the alimentary tract is only important as being a frequent precursor of such a collection.

2. Signs of portal obstruction are the exception in suppurative pylephlebitis.

3. There are no signs by which we can distinguish with certainty cases of portal pyæmia with suppurative pylephlebitis, from those in which the vein is not involved.

4. In "adhesive pylephlebitis" the essential feature is the occlusion of the vein, and this may be produced by a variety of causes, among which sepsis is not an infrequent one.

5. Therefore, if our terminology is to accord with pathological conditions so far as they can be determined during life, we ought to speak of two conditions, portal pyæmia and portal occlusion, remembering that we may meet with cases of portal pyæmia with occlusion.

REFERENCE.—¹*Brit. Med. Jour.* Nov. 25, 1905.

PYLORUS (Congenital Hypertrophy of).

Prof. G. F. Still, M.D.

This malady, as Garrod¹ points out, is probably by no means a very rare one. The examples which have come under the observer's notice were all male infants, and the present writer², amongst a series of 20 cases, saw only 3 females. The characteristic features of the disorder are (1) Vomiting; (2) Constipation; (3) Wasting; (4) Visible peristalsis of the stomach; (5) A palpable tumour in the position of the pylorus. Garrod states that the vomiting is the first symptom to attract attention, and it begins usually from the third to the fifth week after birth; certainly it very rarely begins until the infant is more than a week old, although the present writer has recorded onset of vomiting within the first week, in 4 out of 20 cases. The peculiar features of the vomiting may assist the diagnosis: it is forcible; the stomach ejects its contents so violently that they may be expelled to a distance of several feet from the patient; the vomiting does not occur after each successive feed—it may be only once or twice in the twenty-four hours, and in the meantime the feeds accumulate in the stomach owing to the pyloric obstruction: hence the vomit is usually a large one.

The constipation is a natural result of the scanty passage of food into the intestine, which also accounts for the wasting.

The peristalsis of the stomach is something so striking that once seen it can hardly be overlooked again. A rounded prominence the size of half a Tangerine orange rises up from under the left costal margin of the epigastrium, and passes slowly across the epigastrium from left to right; it is followed at a short interval by another, and another, so that two or three of these prominences are visible at one time on the surface of the abdomen. The hard and thickened pylorus, as Garrod points out, can be felt in almost every case if it is patiently sought for day by day; but as the same observer mentions, there are

many cases in which it will certainly not be felt by mere cursory examination.

PATHOLOGY.—Two views are held at the present time of the nature of the pyloric obstruction. The one regards the hypertrophy as the result of spasm of the pylorus, a spasm which, according to Thomson, of Edinburgh, may begin in intra-uterine life; the other regards the obstruction as due to a developmental hyperplasia; that is, as Cautley³ puts it, "Nature, in her extreme anxiety to provide an efficient pyloric sphincter, has over-exerted herself and produced too great a quantity of muscular tissue;" there is, in fact, a simple redundancy of foetal growth. In support of this view he quotes one case in which a seven-months foetus showed an unusually thick pylorus, and points out the obvious difficulty in supposing the large degree of hypertrophy to have taken place within the few weeks which intervene between the date of birth and the onset of symptoms, as is supposed by those who hold the spasmodic theory. Cautley also objects to this theory on the ground that not all cases are amenable to medical treatment, even if they come under observation at the earliest stage. The most convincing argument, however, in favour of the spasmodic theory is the fact that some cases with well-marked symptoms of hypertrophy of the pylorus, particularly with conspicuous peristalsis of the stomach and easily palpable pylorus, recover completely with such remedies as stomach-washing, or sometimes even careful feeding.

DIAGNOSIS.—Chronic vomiting is common enough in infancy, and may be associated with constipation and much wasting. Cautley (*loc. cit.*) considers that these cases are extremely liable to give rise to an erroneous diagnosis of congenital hypertrophy of the pylorus. He quotes several such cases, but such a mistake ought not to arise, as in none of them is there any conspicuous peristalsis of the stomach or palpable tumour of the pylorus, and a diagnosis of congenital hypertrophy of the pylorus should never be made in the absence of these two pathognomonic signs. As the present writer (*loc. cit.*) has pointed out, very slight peristalsis of the stomach can just be perceived by looking at the abdomen obliquely in a good light in some infants who have vomiting, without anything else to suggest hypertrophy of the pylorus; and probably in some infants in health similar exceedingly slight peristalsis may be visible just after a feed; but the obvious large bulging waves of peristalsis which are to be seen with hypertrophy of the pylorus can hardly be confused with this; moreover, the diagnosis should be clinched in every case by feeling the pyloric tumour.

TREATMENT.—At one time it was supposed that this condition was necessarily fatal unless relieved by surgical operation. It is now quite certain that operation is unnecessary in many cases, but it is too early to decide what proportion are amenable to medical treatment. The fact that recovery may occur without surgical treatment, as Garrod points out, is of extreme importance in deciding the question whether or no surgical interference should be resorted to in any particular case. Increasing records make it probable that a considerable proportion

of the cases can be cured without operation, and it is very important to recognize that the size of the peristaltic waves and the ease of palpability of the pyloric tumour are no criterion of the possibility, or even probability, of recovery or improvement without operation. The most pronounced signs and symptoms may occur in cases which respond well to stomach-washing alone. In every case, therefore, treatment by these milder measures should be given a fair trial before concluding that any operation is needful.

Careful Dieting alone is occasionally sufficient to effect a gradual cure, as in a case recorded by Willoughby Gardner⁴, where a male infant whose vomiting began at the age of eight and a half weeks, and who showed a conspicuous peristaltic wave and a palpable pyloric tumour, slowly recovered under a **Diet of Whey**, and then of **Barley-Water** and raw meat juice with some malt extract, the feeds being at first only a teaspoonful every twenty minutes, and later two, three, and then four teaspoonfuls at longer intervals. A similar case is recorded by Harper and Harper⁵, but here the infant was fed for a few days only with **Saline Rectal Injections**, about half a pint twice daily, and then on peptonized milk, and occasionally a few drops of Valentine's meat juice and white-of-egg; he lost weight, and a wet-nurse was tried without success; the saline rectal injections were continued, and teaspoonfuls of hot water were given by the mouth; later, peptonized milk was partly retained, and with the help of massage of the abdomen with cod-liver oil, the infant gradually made a complete recovery. Two cases have been recorded by Newman Neild⁶, in which typical cases of congenital hypertrophy of the pylorus recovered with minute doses of **Opium** ($\frac{1}{80}$ min. 20 minutes before each feed).

Batten⁷ has recorded a case in which pronounced symptoms, conspicuous peristalsis and the palpable tumour of pylorus, subsided entirely with **Nasal Feeding** continued for twenty-seven days (except on one day when bottle-feeding was unsuccessfully tried). The present writer has recorded several cases in which **Stomach-washing**, repeated once or twice daily for many weeks, was followed by gradual recovery in patients showing typical and pronounced symptoms of congenital hypertrophy of the pylorus. Blaxland⁸ has recorded a striking case in which recovery occurred with this simple treatment by stomach-washing, and Garrod⁹ has recorded another in which progress in weight was being made at the time of record under this treatment.

It is clear, therefore, that not only can this disorder be cured without surgical operation, but that there are several methods of simple procedure which may be effectual, and that it cannot be right to adopt such an extremely dangerous mode of treatment as the various operations in vogue for pyloric obstruction, until it has been ascertained, by careful trial of these milder measures, that no alternative is likely to save the infant's life. Experience makes it probable that there are some cases in which surgical interference is imperative, and several operations have been tried. **Pylorotomy** has been done, and the results have been disastrous, death occurring shortly after

operation. **Divulsion of the Pylorus**, Loreta's operation, has been successful in many cases, and has the advantage of leaving the infant with a normal communication between the stomach and intestine, and the recovery seems to be complete, with no tendency to recurrence if the stretching is done thoroughly. **Pyloroplasty** has been advocated by Cautley and Dent¹⁰, and has had about an equal number of successes and failures, according to the published records as tabulated by Sarvonat¹¹. **Gastro-enterostomy** has been done in many cases, but according to the same authority, it resulted in recovery in 10 cases, and in death in 13 cases, out of 23 recorded operations. (See also STOMACH, SURGERY OF).

REFERENCES.—¹*Clin. Jour.* Sept. 26, 1906; ²*Lancet*, Mar. 11, 1905; ³*Brit. Med. Jour.* Oct. 13, 1906; ⁴*Lancet*, 1903, i. p. 100; ⁵*Lancet*, Aug. 19, 1905; ⁶*Lancet*, Nov. 25, 1905; ⁷*Lancet*, Dec. 2, 1899; ⁸*Lancet*, Sept. 1905; ⁹*Clin. Jour.* Sept. 1906; ¹⁰*Med.-Chir. Trans.* 1903, p. 474; ¹¹*Rétréciss. du Pylore*, Paris, 1905.

RADIUS (Fracture of Head of). (See FRACTURES.)

RECTAL FEEDING.

Robt. Hutchison, M.D.

As the result of a series of careful metabolic observations on patients suffering from gastric ulcer, Boyd and Robertson¹ come to the conclusion that rectal feeding has a much more limited sphere of usefulness than is generally believed. Under the most favourable circumstances a patient can never be nearly completely nourished by such a method, and in addition it interferes with complete gastric rest by inducing a secretion of gastric juice. They find that for practical purposes the following is the best enema to use:—

The yolks of two eggs	.5 gram common salt
30 grams pure dextrose	Pancreatized milk to 300 cc.

The approximate caloric value of such an enema equals 300 calories. Given every six hours the total nourishment injected would equal 1200 calories. Absorption under favourable circumstances might equal 500 calories, but most probably would be much less.

In rectal feeding, the method of administration and the size of the enema are both important points. Nutrient enemata should never be administered with a syringe. To place a syringe in the hands of a nurse is to court failure. Substances rapidly injected into the bowel will as promptly be returned. The enema should be very slowly syphoned in by means of a soft rubber catheter and a small-sized filter funnel. Retention of the nutrient material is not then a matter of difficulty. If there be bowel irritability, a small dose of morphia may be added to the injection. The daily cleansing of the bowel with a saline injection is, of course, an absolute necessity.

The amount of the nutrient injection commonly used is from 4 to 6 oz. (112 to 168 cc.). This is possibly too small an amount. If the enema be given slowly, 8 to 10 oz. (250 to 300 cc.) can be retained, and the patient absorbs at least sufficient water and does not suffer from thirst, a prominent difficulty when small injections are used. Larger

injections do not require frequent repetition, a distinct advantage where gastric rest is desired, for it must be remembered that the injection of nutrient material into the lower bowel excites gastric secretion, and may thus prevent the healing of a gastric ulcer, and account for the gastric pain so frequently complained of in gastric cases under rectal feeding. This gastric secretion, though long recognized clinically, has been clearly demonstrated recently by Umber in a patient on whom gastrotomy had been performed. After a rectal injection there was a free gastric secretion, with a total acidity of 30, free hydrochloric acid equalling 20.

REFERENCE.—¹*Scot. Med. and Surg. Jour.* Mar. 1906.

RECTUM (Cancer of).

P. Lockhart Mummery, F.R.C.S.

Boas¹, in a series of 500 cases of cancer of the digestive tract, found 83 of cancer of the rectum. That is to say, about 16 per cent of all cases of cancer of the alimentary tract occur in the rectum. From a study of his 83 cases, Boas finds that the most usual early symptoms of cancer in the rectum are: (1) Tenesmus; (2) Constipation, alternating with diarrhœa; (3) Hæmorrhage; (4) Flatulence accompanied by colicky pains. Loss of general health is not an early symptom. The diagnosis can be definitely decided by digital examination, supplemented, if necessary, by the use of the sigmoidoscope. A fact which may sometimes be made use of in deciding between the obstructive diarrhœa of cancer and simple chronic diarrhœa, is that, while in the latter indicanuria is never present, in the former it frequently is.

The essential factor in diagnosing cancer of the rectum is to make a thorough and careful examination of the rectum in all cases where it is suspected. Wallis² points out that malignant disease of the rectum may occur at any age, and he mentions a case where the patient was only fifteen. The symptoms vary according to the situation of the growth. Thus, when the growth is low down, pain, tenesmus, and a feeling of weight in the perineum are early symptoms. Bleeding also occurs earlier when the growth is near the anus, as it is more easily damaged by the passage of fæcal material. When the growth is situated high up in the bowel, the symptoms in the early stages are unfortunately often so slight that they are not sufficient to cause the patient to seek medical advice until too late. Persistent diarrhœa is one of the commonest symptoms in such cases, and diarrhœa in an otherwise healthy individual of middle or advancing age is always suggestive, and should lead to a thorough and careful examination. I have pointed out³ that typical symptoms of mucous colitis may result from a growth in the upper rectum or sigmoid flexure, and that it is advisable to examine all cases of colitis most carefully, preferably with the electric sigmoidoscope, so as to be able to detect those cases where the symptoms are due to malignant disease. There is often no bleeding at all in the early stages of cancer of the upper bowel, and from the symptoms alone it may be quite

impossible to distinguish between cancer in this situation and true mucous colitis.

Hartwell⁴ publishes an analysis of 46 cases of operation for the **Radical Treatment** of cancer of the rectum. The operative mortality was 26 per cent, the fatal result being due to sepsis in the majority of cases. This danger can to a very large extent be eliminated by more careful technique. He is in favour of more radical operations, and of performing a preliminary colostomy in all cases. Wallis⁵ records a successful case of **Excision of the Rectum**, with subsequent repair of the normal channel. Schloffer⁶ discusses the relative merits of the abdomino-perineal and the abdominal routes for removal of cancers of the bowel. He comes to the conclusion that the mortality is lower with the purely abdominal route.

Morton⁷ records three cases of **Resection of the Sigmoid** for cancer. In each case colotomy was first performed for the relief of obstruction. One case lived a year and nine months before recurrence proved fatal; one died without recurrence eighteen months after the operation; the third was still well, three years after operation.

Tuttle considers⁸ that colostomy should only be performed for actual obstruction, and considers it a useless operation for the relief of symptoms in cancer of the bowel when obstruction does not exist. In the case of growths in the sigmoid flexure, he favours **Ileosigmoidostomy** or **Rectostomy**, and in growths of the ampulla he advocates the use of the **Curette** and **Cautery**. Mitchell⁹ records a case of child-birth 10 months after colostomy for rectal cancer, in a woman 28 years of age.

REFERENCES.—¹*Med. Chron.* May, 1906; ²*Clin. Jour.* April 25, 1906; ³*Pract.* Aug. 1906; ⁴*Ann. Surg.* Sept. 1905; ⁵*Trans. Med. Soc.* vol. xxviii.; ⁶*Beit. z. klin. Chir.* Bd. xlii.; ⁷*Brit. Med. Jour.* 1906, 1149; ⁸*Med. Rec.* Nov. 2, 1905; ⁹*Brit. Med. Jour.* Mar. 3, 1906.

RECTUM (Prolapse of).

P. Lockhart Mummery, F.R.C.S.

It is necessary to distinguish carefully between prolapse of the rectum, or procidentia, and prolapsus ani. The latter is a condition usually associated with piles, and the mucous membrane only is involved, while in the former condition the whole of the rectal wall comes down and is involved in the prolapse, and in severe degrees of procidentia the peritoneum is dragged down and forms part of the prolapsing mass. Prolapse of the rectum in adults is in marked contrast to the same condition in children. In children, prolapse of the rectum, though commonly met with, is easily amenable to treatment in the great majority of cases. In adults, on the other hand, little or nothing can be done to relieve the condition apart from operation, and the results are often far from satisfactory, recurrence of the prolapse after a few months or years being far too common. In bad cases the condition is a most distressing one in adults, the slightest exertion being sufficient to bring down the bowel.

Hofmann¹ agrees with Waldeyer in thinking that prolapse of the rectum resembles hernia, in that it is due to weakness of the

retaining wall. He believes that an impaired pelvic floor is necessary to its production. In support of this he refers to the fact that prolapse of the rectum is most common in children and weak women in whom the pelvic musculature is deficient. Hofmann advocates an **Operation to restore the Pelvic Floor** in a manner similar to that adopted in cases of prolapse of the uterus which result from rupture of the perineum. After a careful preparation of the part, he makes an **H-shaped** incision behind the anus, the transverse incision being between the coccyx and anus, and the two lateral incisions passing forwards, one on each side of the anus, and backwards on each side of the coccyx. The incisions are carried down into the post-rectal space, and the anterior and posterior flaps being separated, the resulting wound is sewn up in an anteroposterior direction with non-absorbable sutures. This closely resembles the Lawson Tait operation for ruptured perineum. A stricture of the rectum cannot result, and no tissue is sacrificed. Primary healing of the wound is necessary to a successful result. I have several times performed a similar operation to this, only using a **U-shaped** incision in place of the **H-shaped** one advocated by Hofmann. The results have been most satisfactory in the cases I have operated upon, and the operation is a far less severe one than colopexy or excision. In very severe cases of prolapse, where a lot of bowel protrudes, colopexy or rectopexy may be necessary in addition, to effect a cure.

Delaup² is in favour of **Rectopexy** in cases of severe prolapse. This operation was first practised by Fowler in 1897. It consists of fixing the rectum into the hollow of the sacrum by anchoring sutures, brought out on each side of the coccyx and lower part of the sacrum and tied over a gauze pad. There is a good description of this operation in Tuttle's *Text-Book of Rectal Diseases*.

Drew³ advocates treating severe cases of prolapse by **Excision** of the entire mass, and reports two cases in which this operation was performed. The length of bowel removed in one case was nine inches, and in the other fifteen inches. Both patients made a good recovery, and were well twelve months after the operation.

REFERENCES.—¹*Amer. Jour. Med. Sci.* April, 1906; ²*Med. Chron.* July, 1906; ³*Clin. Jour.* May 30, 1906.

REFRACTION (Errors of).

A. Hugh Thompson, M.D.

In some notes on "Unusual Forms of Migraine in Children," Stephenson¹ describes the three following groups: (1) Migraine, preceded, accompanied, or followed by temporary aphasia; (2) Migraine replaced by bouts of vomiting; and (3) Migraine associated with alterations of sensation or disturbances of mobility in the upper or the lower extremities. Since vasomotor changes of the cerebral cortex or of the meninges are commonly believed to be the immediate cause of the visual manifestation of migraine, it is intelligible, says Stephenson, how the above types of migraine can arise from a spreading of the vasomotor disturbance to adjacent cortical areas. Many of the cases

of which he gives details were either cured, or much relieved, by the constant wearing of proper glasses.

Myopia.—The gradual growth of myopia during school life is a well-known fact, but the road by which children who are not originally myopic gradually become so is not so generally realized. From an examination of 1,940 children in the public elementary schools of London, the writer² has collected statistics which prove that many children who, when they leave school at the age of 14, are myopic, originally suffered from hypermetropic astigmatism. The close application to reading and writing rendered necessary by their original defect (so long as it is uncorrected by glasses) gradually leads to a lengthening of the antero-posterior axis of the eye, and their astigmatism, which was originally hypermetropic, first becomes "mixed" and finally myopic. The only way to prevent it is the early prescription of correcting glasses. It would be a mistake to suppose, however, that all myopia is acquired in this way, for a further point brought out is, that myopia exists among children under seven to a greater extent than is generally realized. Probably 1 per cent of the children in our infant schools already have myopia, and that in a degree more serious than is the average among elder children who are myopic. For these, as also for those children whose sight is permanently crippled by the results of disease (phlyctenular keratitis being the most common), it is highly desirable that special schools or classes should be instituted where, without being treated as blind, the calls on their eyesight may be reduced to a minimum.

Hereditary Influence in Myopia.—Among 687 cases of myopia investigated by Worth³, 654 were classed by him as non-malignant, and 33 as malignant, as evidenced by gross secondary changes in the fundus. Out of the 654 non-malignant cases, 366, or 56 per cent, gave a history of myopia in parent, grandparent, uncle or aunt, brother or sister; and of the 33 malignant cases, only 8, or 24·25 per cent, did so. Thus, the hereditary influence is less marked in the malignant than in the non-malignant type. In families where an hereditary influence can be traced, the number of males affected is considerably greater than the females. In one family nearly all the males were affected, but no females, and the myopia was transmitted through the female line; moreover, the amount of myopia in each case was about the same (viz. 10–12 D) and all the myopic eyes had brown irides, while those of the healthy eyes were blue.

Operative Treatment of Myopia.—It is now sixteen years since Fukala⁴ successfully began to practise needling of the lens in cases of high myopia, since when the operation has become very general in all countries where ophthalmic surgeons practise. Not, however, universal; for in spite of the brilliant results which in the great majority of cases follow the surgical treatment, it has always been admitted that there are certain possible dangers, and it is a fact that some surgeons have been so impressed with them, and more especially with the risk of detachment of the retina, that they have abandoned their

former practice, and prefer to leave bad alone rather than run the risk of rendering it hopeless. Hippell⁵ was able to follow up 263 myopic eyes which had been needled at various periods up to twelve years previously; of these 25, or 9.5 per cent, had detachment of the retina. Taking a large number of myopic eyes with myopia of over 14 D not operated on, he finds that in them the proportion with retinal detachment is about 6.5 per cent. This leaves a balance of 3 per cent of the cases which undergo the Fukala operation, where a subsequent detachment is probably attributable to the operation itself.

Another surgeon—Huber⁶—followed up 75 patients on whom Haab had operated on one eye for high myopia from three to ten years previously. He found that macular changes, vitreous opacities, and retinal hæmorrhages were all more frequent in the operated than in the non-operated eyes; in no less than 5 cases, detachment of the retina had occurred in the operated eye, in no case in the non-operated. With regard to refraction, he found that the axis of the globe had, on the average, continued to lengthen in the operated eyes, so that it is evidently our duty to instruct the patients to save their eyes after the operation as well as before.

De Font-Reaulx⁷ examined the published notes of 1,620 cases which had been operated on up to 1900, and of these 1,492 showed improvement as an immediate result. In spite of the improvement in distant vision, he found that the majority of the patients preferred to use the sound eye for near work to using the operated one with a convex glass. He therefore advocates that only cases having above 20 D of myopia should be operated on, as a rule. He, like Huber, finds that the operation has no tendency to put a stop to the lengthening of the eye, and reminds us that in estimating this, whereas in the complete eye each millimetre of length corresponds to 3 dioptries of refraction, in the aphakic one it corresponds to only $1\frac{1}{2}$. (This very fact, by the way, was used by Fukala as an argument in favour of his operation, since with an aphakic eye exact focussing is comparatively unimportant, and the high myope, after operation, can read medium print over a much greater range than he could when, previous to operation, his far point was within a few inches of his eye). With regard to detachment of the retina, while Fukala and other writers have maintained that it is no more frequent in eyes that have been operated on than in similar eyes that have been left, De Font-Reaulx maintains that it is sometimes a sequel to the operation itself, especially in cases where loss of vitreous occurs, or iritis supervenes. Nearly all operators, he says, have had detachments to deplore.

The evidence to hand, while certainly not tending to condemn the operation in carefully selected cases, in face of the undisputed benefits that it has conferred on a large number of patients, must as certainly make us realize that it is a procedure not free from danger. The question is of such great importance that it is highly desirable that other surgeons, who have had a large experience of the operation, should declare their results. For a useful bibliography of those published up

to 1905, an article by Barnes⁸ may be consulted. In America, it seems, the operation has as yet been very little practised.

REFERENCES.—¹*Med. Press*, April 18, 1906; ²*Brit. Med. Jour.* July 28, 1906; ³*Ophth. Rev.* May, 1906; ⁴*Ibid.* 1895, p. 108; ⁵*Ibid.* Dec. 1905; ⁶*Beitr. z. Augenh.* Sept. 1905, in *Ophthalm.* July, 1906; ⁷*Ophth. Rev.* July, 1906; ⁸*Med. Rec.* June 17, 1905.

RETINA (Diseases of the).

A. Hugh Thompson, M.D.

Detachment of the Retina.—This is one of those conditions which, without being absolutely hopeless (at least in recent cases), presents a problem so difficult and so frequently disappointing to the patient, as to be one of the most unsatisfactory conditions with which the ophthalmic surgeon has to deal. Ramsay¹ recently read a paper to the Ophthalmological Society giving the results of fifty cases which he had treated systematically on the following lines: (1) Rest in bed for a month; (2) Pressure bandage applied to both eyes; (3) Subconjunctival injections of bicyanide of mercury 1–2000 in an 8 per cent solution of sodium chloride, supplemented in some cases by dionine. These injections were repeated at intervals of from four to six days; (4) Evacuation of the subretinal fluid by scleral puncture; (5) Attention to proper action of the skin and bowels; (6) In cases which showed no improvement after ten or fourteen days, injections of pilocarpine were given alternately with the subconjunctival injections. It must be confessed that the results of this exceedingly energetic course of treatment were somewhat disappointing. More than half of the cases certainly received no benefit whatever, and those who showed decided improvement were only ten, i.e., 20 per cent. Surgeons who adopt the simple treatment of rest in bed alone have results certainly no worse.

Wernicke² has searched the literature of the subject up to August, 1905, to find all recorded cures of not less than one year's duration. Out of 351 cures, 84 had been treated by operation, 158 by rest alone, and 109 had practically no treatment at all. In the Breslau clinic the number of cures recorded in nine years was 36 out of 422 cases, or 8·5 per cent, most of the cases of cure having undergone no operation whatever. Of the cases operated on, out of 9 cases in which scleral puncture was performed, 1 was cured; out of 41 cases in which scleral puncture was performed and subconjunctival injections used, only 2 were cured; out of 13 cases in which scleral puncture was performed and the galvano-cautery used, 2 were cured. According to these statistics, therefore, the last is the only operative procedure which improves the patients' chances of recovery.

An instructive case is reported by Craig³, who had to treat a case with myopia of – 8 D in which symptoms of detached retina had existed for three weeks. Dorsal decubitus, subconjunctival injections of 2 per cent salt solution, and daily hypodermic injections of pilocarpine, gr. $\frac{1}{3}$, were entirely without effect. At the end of a week, scleral puncture was performed, the immediate effect of which was all that could be desired, but in four days the detachment had returned.

Scleral puncture was now repeated, and in addition, the galvano-cautery was applied over the seat of operation, with the intention of setting up an adhesive inflammation of the parts. This time the good effect lasted longer, but in eight days the detachment was again observed. Once more a scleral puncture was made, after dissecting back the conjunctiva so as to allow the puncture to be made as far back as possible, and this time the cautery was more energetically applied. The result seems to have been a complete cure, for when the patient was seen twenty months after the termination of treatment, no sign of detachment could be detected, and vision was $\frac{6}{6}$.

Obstruction of the Central Artery of the Retina.—This is a subject which will be found referred to in the *Medical Annual* for 1903. Coats⁴ “has been able to find twenty-four cases in which eyes having obstruction of the central artery of the retina have been examined pathologically. Although many of the cases have been ascribed to embolism, yet those most recently investigated show that the blocking was due rather to endarteritis, or to thrombosis, or to both factors. At the same time some of the cases have undoubtedly been due to embolism. Of the two cases examined by Coats himself, in one the obstruction was due to a calcareous nodule, which had in all probability been carried from a diseased aortic valve and formed an embolus; the second was a case in which a great many of the retinal vessels, both arteries and veins, had their calibre very much reduced by endarteritis obliterans.

Hæmorrhages in the Eye present at Birth.—Coburn⁵ examined the eyes of 37 infants who were still-born, or who had lived for varying periods up to twenty-two days, and found retinal hæmorrhages in 17 of them. These cases, no doubt, were those of congenitally weak infants, and the percentage is no doubt far larger than would be observed in living infants, some of the hæmorrhages being so fine that they would have escaped observation with the ophthalmoscope. Their destructive effect is, as a rule, very slight, but they may cause sufficient injury to affect the visual acuity, and it is not improbable that some cases of congenital amblyopia may be accounted for in this way. The coloured races are, it seems, peculiarly liable to these hæmorrhages, and, of course, those with a hæmorrhagic diathesis. “The probable cause,” says Coburn, “is a disturbance of the retinal circulation, resulting from compression of the optic nerve and its central blood-vessels due to a distension of the optic nerve sheath with cerebrospinal fluid, from compression of the head occurring at birth.”

Danger to the Retinal Circulation from Injection of Paraffin into the Nose.—Several cases have now been recorded⁶ in which injections of paraffin, intended to remedy deformities of the nose, have been followed by loss of sight, more or less complete and permanent. There is an extensive subcutaneous venous plexus which receives blood from the palpebral and orbital regions, and ultimately discharges itself into the ophthalmic vein. If the end of the needle of an injecting syringe enters one of the veins of this plexus, the material might find its way into the ophthalmic vein, and, solidifying there, give rise to thrombosis,

which might spread back along the veins returning from the eyeball, and so along the central vein of the retina. Whether or not this is the correct explanation, the possibility of the accident should be borne in mind by those who have to deal with deformities of the nose.

REFERENCES.—¹*Ophth. Rev.* Mar. 1906; ²*Klin. Monats. f. Augenh.* Mar. and April, 1906, and *Ophth. Rev.* July, 1906; ³*Brit. Med. Jour.* Dec. 23, 1905; ⁴*Royal Lond. Ophth. Hosp. Rep.* Oct. 1905, and *Ophthalm.* Feb. 1906; ⁵*Archiv. of Ophthalm.* May, 1904, and *Brit. Med. Jour.* Feb. 7, 1906; ⁶*Annales d'Oculist.* Sept. 1905 and *Ophth. Rev.* Feb. 1906.

RHEUMATIC FEVER. (See SERUM-THERAPEUTICS.)

RINGWORM.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Whilst mainly devoted to treatment, Sequeira's¹ article gives a *résumé* of the varieties of ringworm fungus. He points out that his previous belief that kerion was always due to the large-spored fungus is not correct, the small spore, as we have always contended, being frequently responsible for the inflammatory lesion. On the nails the ectothrix is usually the active fungus, but recently he found the endothrix in one case.

A very interesting outbreak is detailed in another paper by the same author². A boy of fourteen years presented himself with a large ulcer of the umbilicus, and on being stripped there was observed a scaly condition of the trunk and extremities, which on examination proved to be ringworm. The patient's sister had been affected for fifteen years, and the patient himself for eight years, but no other member of the family had any skin affection. Three years previously he had an illness, said to be scarlet fever, and from this he made a rapid recovery. During the next year a swelling appeared about the umbilicus and broke down, and although it healed up under the application of ointments, broke down again. On admission, his general health was found to be bad. The umbilical ulcer measured nearly three inches by one and a half, was unhealthy in appearance, with margins thickened and indurated. On the right wrist there was a circular infiltrated patch the size of a penny, resembling a local tuberculide; it had never ulcerated. Microscopically the fungus proved to be an endothrix. The ulcer was treated by fomentations of **Boric Acid** and **Lysol**, and the scaly eruption with 1-12 solution of **Iodine**. All parts eventually healed up except the nails, which, used in scratching, spread the disease again. It is intended to remove these as the only satisfactory treatment available.

In discussing general treatment, he states that in non-hairy parts healing rapidly follows the use of **Soft Soap** and hot water, followed by the inunction of **White Precipitate Ointment**. After removal of affected nails, the nail-beds are best treated with salicylic and mercury ointment.

The main portion of the first paper is devoted to epilation by means of the **X Rays**. Patients with fine hair require shorter exposures,

and the beard region is also sensitive, and is apt to react severely if there is much folliculitis. The ideal is to get all the hair out with one dose, else fresh growing hairs may become affected.

He works with two different voltages, 62 and 240, and advises that coils should be wound for the voltage to be used. The average current used in the primary is 5 ampères. Large coils, in his opinion, do not work so well with rapid interruption, and the following are his data: 500 to 600 interruptions per minute. Spark gap of 12 to 15 cm. Penetration 6 or 7 of Benöist's scale. Secondary current 0.7 ma. Distance 15 cm. Exposure 16 minutes. The whole should be controlled by the use of Sabourand's pastilles: although they vary they give some index; they should be placed half-way between the anode and the part to be treated.

After exposure, the affected part is painted with collodion, to prevent the affected hairs from spreading the disease, while the rest of the head is kept constantly cleansed by parasiticides. When the whole scalp is affected, great care must be taken, as one part may get an overdose, and even though it involves longer time, it is best, in his opinion, to only irradiate small areas at a time.

Kerion, he says, does not require X rays, as fomentations with **Boracic Acid** suffice for cure. On this point we are inclined to disagree, as in our experience kerion has done very well with X rays.

Out of 115 cases treated, 107 were small-spored ringworm, and 8 favus. In 2 only epilation was incomplete; in 1 case there was erythema, and in 1 vesication: in 15 the hair was found to be growing in a month; in 46 at the end of two months; in 23 after three months; in 2 after four months.

Twenty-five cases of *linea barbæ* and *sycosis* were treated satisfactorily.

Ohman Dumesnil³ gives an account of another wide-spread case in which washing with **Green Soap** and the rubbing in of **Sulphur Ointment** was followed by cure.

Dreuw⁴ recommends the following plaster to be kept on for six to eight days in stubborn patches of ringworm of the body and beard:—

R	Acid. Salicyl.	10 parts	Green Soap	
	Olei Rusci		Vaselin.	ãã xxv parts
	Chrysarobin.	ãã 20 parts		

We have tried this with not very brilliant success, and would recommend others to see that the plaster is absolutely fresh, as it soon loses its strength.

REFERENCES.—¹*Brit. Med. Jour.* July 28, 1906; ²*Brit. Jour. Derm.* Aug. 1906; ³*St. Louis Med. and Surg. Jour.* April, 1906; ⁴*Monats. f. Prakt. Derm.* 1905, Bd. xl, No. 10.

SCARLET FEVER. (See also SERUM-THERAPEUTICS.)

E. W. Goodall, M.D.

ETIOLOGY.—In an interesting paper, C. J. Lewis¹ gives an account of the bacteriology of aural and nasal discharges in certain of the acute infectious diseases. The cases examined were as follows: 46 cases of

purulent otorrhœa in scarlet fever; 26 of rhinitis in scarlet fever; 4 of rhinitis in whooping cough; 5 of otorrhœa in diphtheria; 6 of rhinitis in diphtheria; 4 of otorrhœa in measles; 5 of rhinitis following measles; 3 of otitis media not connected with any infectious disease; 6 of mastoid abscess; 1 of suppurating frontal mucocoele. The following are the conclusions he draws from his observations and experiments.

1. Purulent discharges of aural and nasal derivation exhibit a variety of bacteria, and do not depend upon a single micro-organism common to all cases.

2. There are four main groups of organisms which exceed all others in frequency of occurrence in such discharges, viz., pneumococci, streptococci, staphylococci, and bacilli of the diphtheria group. These, however, do not comprise all the varieties which the pus may contain.

3. Pure cultures from these discharges are the exception rather than the rule; yet they occasionally occur, and may be met with in about 10 per cent of the cases.

4. While the discharges are not usually monomicrobial, and do not always contain the same organisms in particular diseases, nevertheless the bacteriological contents of such discharges associated with individual diseases present distinctive differences. For example, in this series of cases, the aural and nasal discharges in diphtheria always contained bacilli of the diphtheria group, the nasal discharges of whooping cough always contained staphylococci, and the aural discharges of measles likewise always contained staphylococci. The absence of streptococci in the rhinitis of whooping cough, and in the otitis of measles, may be accidental, but is certainly suggestive in contrast to their prevalence in the otitis and rhinitis of scarlet fever. In the pus from a mastoid abscess pneumococci and streptococci are more common than staphylococci.

5. In scarlet fever aural suppuration is not always due to the same organism. Either the pneumococcus, the *Streptococcus pyogenes*, or a bacillus of the diphtheria group may be responsible, and having regard to the frequent presence of staphylococci in such pus, there is no reason to doubt that cases occur in which a staphylococcus is similarly responsible, though, as it happened, no case in this series showed a pure culture of a staphylococcus.

6. In scarlet fever nasal suppuration may be of streptococcal, staphylococcal, or pneumococcal origin. Probably it may sometimes be due to bacilli of the diphtheria group.

7. In scarlet fever the pneumococcus is present in otitis much more frequently than in rhinitis. It occurred in 56.5 per cent of the former, and only in 23 per cent of the latter cases.

8. In scarlet fever the organisms present in aural and nasal discharges are less virulent in the later than in the earlier stages of the suppuration.

9. In the rhinitis of scarlet fever streptococci may retain their pathogenicity even when the discharge has lasted for more than a month.

10. If the infectivity of post-scarlatinal discharges bears any relation to their source and duration, or depends upon the pathogenicity of

the organisms present, these observations suggest that otitis and rhinitis are equally dangerous in their early stages, but that the nasal discharge is more likely to contain virulent streptococci in its later stages. Perhaps we may go further, and suggest that rhinitis may be the most fruitful source of consecutive and "return" cases. I am not aware whether this indictment of rhinitis coincides with the general experience of hospital physicians, but some confirmation of it is afforded by the opinion expressed by Dr. Pugh in a recent address on the infectivity of scarlet fever. [Most medical men connected with fever hospitals are of the opinion that the patients who give rise to "return" cases are most frequently those who are the subjects of rhinorrhœa on or after their discharge from hospital. Dr. Cameron's evidence, given in his report to the Metropolitan Asylums Board, supports this view. But his evidence is not complete; and in a more recent report Dr. F. M. Turner brings forward some evidence which goes to show that the rhinorrhœa cases are not more infectious after their discharge from hospital than the rest.—E. W. G.]

11. The frequency with which bacilli of the diphtheria group are present in the aural and nasal discharges of scarlet fever is very notable. It suggests that scarlet fever and diphtheria may bear a closer relationship than is commonly assigned to them. The epidemiology of these diseases in particular localities requires, and would probably repay, more thorough comparative study.

By bacilli of the diphtheria group are meant the true diphtheria (Klebs-Loeffler) bacillus, the pseudo-diphtheria bacillus, and Hoffmann's bacillus. The patients from whom the cultures were obtained were in the wards of the Edinburgh City Hospital. The organisms were examined not only from the cultural but from the physiological point of view.

The study of "return" cases still continues to occupy attention. F. M. Turner² has presented a report to the Metropolitan Asylums Board, in continuation of the work done by A. G. R. Cameron. He differs from the latter's conclusions in several respects. In the first place, he shows that very few of the "return" cases can be ascribed to coincidence. Secondly, from a study of 1000 consecutive cases at one of the hospitals, it appears to him that patients who had suffered from rhinorrhœa while in hospital, are not more likely to give rise to "return" cases than those who have been affected with some other complication, or with none at all. Thirdly, in diphtheria, the bacteriological examination of the patients before their discharge, and their detention till the cultivations are negative, has not prevented the occurrence of "return" diphtheria cases: nor do those hospitals which employ such bacteriological examination show better results than those which do not. In scarlet fever the adoption at some of the hospitals of the Metropolitan Asylums Board of certain measures (e.g., separation of acute from convalescent patients, and the employment of a special ward for patients about to be discharged) does not appear to have any appreciable effect on the incidence of "return"

cases. Altogether, as Turner remarks, his conclusions are disappointing, inasmuch as no positive result has been obtained, such as might suggest the adoption of measures which would lead to the reduction in the number of "return" cases.

The occurrence of "return" cases, so long recognized in this country, is now beginning to attract attention on the Continent, as appears from a paper on the subject by Prof. Sørensen, of Copenhagen³.

COMPLICATIONS, ETC.—Méry and Hallé⁴ draw attention to the perforations of the soft palate which are occasionally met with in scarlatina anginosa. Apparently these authors are unaware that these perforations have been described before by others besides Henoch. Henoch described them in diphtheria; but Walter Fowler wrote an account of them in scarlet fever in the *Lancet* for 1889 (vol. ii.); and there is a paper about them in the forty-sixth volume of the *Pathological Transactions*. Usually the cases in which they occur are severe, with pronounced faucial lesions. The perforations, which are always in the pillars of the fauces, sometimes do not close up, but persist permanently, after the recovery of the patient. If the patient comes under treatment subsequently, the presence of the perforation is usually put down either to syphilis or to a congenital deficiency, and scarlet fever is not thought of as a cause.

In a clinical lecture on the complications of scarlet fever, W. Hunter⁵ draws attention to the influence exerted by *oral sepsis*. He does not, in his lecture, accurately define "oral sepsis." The nearest definition he gives is as follows: "I have taken note of the presence and degree of 'oral sepsis,' in all cases admitted—the presence of foul sores around the teeth, foul gingivitis,"—so that ulceration and inflammation of the gums may be taken as a definition of "oral sepsis."

Hunter states that "the subsequent incidence of complications is not sufficiently accounted for by the character of the initial features [rash, angina, fever]; other causes to which these complications (in the individual case) can be ascribed have to be sought for, and are not easily found." He then goes on to state that he has studied the influence of "oral sepsis," existing, presumably, when the patient is attacked by scarlet fever, on the course of the scarlet fever. "The result cannot be expressed statistically, because of the prevalence of this condition (oral sepsis), but one result comes out clearly: that the severity of scarlet fever, that is to say, of the septic complication of it, is greatly influenced by the degree of oral sepsis in the patient before he is admitted." The writer gives figures in support of this statement, from which it would appear that the severity of initial and secondary angina and of severe complications depends upon the presence of "oral sepsis." Therefore it is very important to treat it so as to diminish, if not abolish, the chance of severe complications subsequently arising.

[I am not disposed to agree with Hunter's conclusions. Naturally, if a person who is the subject of "oral sepsis" is attacked by scarlet fever, he is likely to fare worse than is the person who has no oral

sepsis at the time he is attacked by the fever; the former person will be suffering from two diseases at once. But I too often meet with cases of scarlet fever, severe at the onset and followed by severe complications, in which there is not a sign of oral sepsis, and also with mild cases, without marked angina or complications at any time, but with oral sepsis, to believe that the latter has any influence on the common complications of scarlet fever.

In Hunter's lecture the word "septic" frequently occurs, in connection with the initial attack of scarlet fever itself and with certain of the complications. He has only followed the fashion of recent years. It has become the custom to term what used to be called "scarlatina anginosa," "septic" scarlet fever. But still more recently the term "septic" has been applied by some writers to cases of scarlet fever in which certain complications have occurred, even when the initial attack has been mild and without any marked faucial lesion; the complications to which I refer are rhinorrhœa, otorrhœa, secondary sore-throat, and adenitis. Hence "septic" scarlet fever may mean one of two different conditions. To me it appears advisable to drop the word "septic" altogether in dealing with scarlet fever. It is a question-begging epithet. We do not at present know the cause of the disease; though I notice that Hunter, in his lecture, states that it is "apparently" a streptococcus.—E. W. G.]

DIAGNOSIS.—We occasionally meet with cases presenting a combination of symptoms strikingly like those of scarlet fever; yet the history of previous attacks and certain other points, show fairly conclusively that the patient is not suffering from that disease. The following case, which came under the observation of J. Beard and T. W. N. Barlow⁶, of the Bootle Fever Hospital, is an excellent example of the condition to which we allude.

"A male, aged twenty-three years, was admitted into hospital on January 13th, 1906, notified as scarlet fever. The history given was that he became ill two days before, with a rash on his chest and a slight feeling of soreness and stiffness about his throat. His temperature on admission was normal. The history he gave was that he had had several similar attacks, that he always peeled profusely, and that he had been in this hospital twice before in the same condition, and once in one of the Liverpool city hospitals. On giving this history he was isolated, and on examination he was suspected to be suffering from erythema scarlatiniforme. His condition was as follows. On the front and back of the chest there was a well-marked erythematous eruption, but it was not papillated, and the rash on the front of the chest was more marked than on the back. The erythema extended from the suprasternal notch (where it was sharply defined) to about the level of the umbilicus, where it gradually merged into a normal skin. The skin of the extremities was quite normal, as was that also of the trunk below the level of the umbilicus. The tongue was slightly reddened and was covered with a thin grey coating, but was not characteristic of any disease. The throat was very slightly reddened,

and the ears, the nose, the glands, and the urine were quite normal. On looking up the record of his previous admissions, we found that the diagnosis on both occasions had been amended from scarlet fever to erythema scarlatiniforme. Forty-eight hours later, the skin of the whole of the trunk was desquamating in large, thin, white flakes, not only the parts which were on the first examination erythematous, but also the remaining parts of the trunk where no erythema had been observed. The desquamating skin could be readily swept from the body by rubbing lightly with the finger, but the most important feature of the condition at this stage was that there were larger areas of erythema, showing a peculiar glistening and greasy appearance, of those parts from which the superficial desquamation had taken place. Next day symmetrical patches of desquamation were seen in front of the elbow-joints, leaving the same erythematous base as observed on the trunk. Later in the day the hands and the adjacent parts of the wrists for about two inches also began to desquamate. The lower extremities did not show any signs of peeling, and five days later the man was discharged from the hospital perfectly well." The patient stated that this was the eighth attack. In this case the cause of these symptoms was not ascertained. All that can be said is that the patient suffered from "erythema scarlatiniforme." The attacks recur; desquamation commences early and is continued late. The rash is prone to be patchy; the fauces are slightly if at all inflamed. Where desquamation has taken place (according to Beard and Barlow), erythematous patches are left, having a peculiar glistening and greasy appearance. The disease is described in Malcolm Morris's work on "Diseases of the Skin." The first attack is extremely likely to be accepted as scarlet fever, but repeated attacks should arouse suspicion.

TREATMENT.—A case of that serious, but fortunately rare, complication or sequel of scarlet fever, purpura hæmorrhagica, which was treated by **Calcium Chloride**, is reported by Banks⁷. At first the dose was 5 gr. every four hours; two days later it was increased to 10 gr. Vomiting was apparently stopped by a hypodermic injection of **Morphia**. The patient, a lad aged seventeen years, made a good recovery. This complication is so often intractable and fatal, that, as recovery took place in the case reported, it would be worth while to try calcium chloride in a similar case.

REFERENCES.—¹*Scot. Med. and Surg. Jour.* Nov. 1905; ²*Metrop. Asy. Board, Report on "Return" Cases*, 1906; ³*Ther. Monats.* Mar. 1906; ⁴*Arch. de Méd. des. Enf.* Dec. 1905, quoted in *Sem. Méd.* Jan. 31, 1906; ⁵*Brit. Med Jour.* Feb. 24, 1906; ⁶*Lancet*, Mar. 31, 1906; ⁷*Ibid.* May 26, 1906, p. 1466.

SCHISTOSOMIASIS.

J. W. W. Stephens, M.D.

For the present we may use this term for infection with *Schistosomum japonicum*, reserving bilharziasis for infection with *S. hæmatobium*.

Logan¹ records cases from the Fuh-kien, Anhwei, and Hunan provinces of China. The eggs found in the fæces measured 72 by 48 μ .

Schistosomum japonicum has now been recorded from the Philippine

islands by P. G. Woolley². Eggs were found in the submucosa of the gut, in the liver, and in the tissue surrounding a lung abscess.

Woolley states that diarrhœa is usually the first symptom, followed by progressive anæmia and severe ascites. Most striking is the shape assumed by the trunk; the hypogastrium shrinks, the epigastrium enlarges, a furrow just above the umbilicus separating the two and producing an appearance like an inverted gourd. The liver at first enlarges and then decreases in size. There is bloody diarrhœa.

REFERENCES.—¹*Jour. Trop. Med.* Oct. 1, 1906; ²*Philippine Jour. Sci.* Jan. 1906.

SCLEREMA NEONATORUM.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

A lengthy and comprehensive description of this disease is given by Carpenter and Neave¹. They divide it into two varieties, of which the first attacks healthy children at birth, is practically confined to the skin and subjacent structures, and usually ends in recovery at about six months, while the second, more usually found on the Continent, attacks weaklings, often of premature birth, and is a severe malady with grave constitutional symptoms of the alimentary and respiratory tracts, generally ending in death.

They describe a case of the first variety, in which the disease extended over the back, buttocks, neck, lower part of the scalp, backs of arms, deltoid regions, and backs of thighs. The edges gradually thinned, there was no pitting, the colour was pink, and the whole felt like a layer of indiarubber inserted underneath the skin. The glands in the neck and groin were enlarged and shotty. The spleen extended to one finger's breadth below the ribs, but the blood was normal on examination. The whole condition cleared up in five months.

TREATMENT.—**Massage** was given regularly. For a month **Thyroid** was administered with some improvement, but then **Thymus** was given instead, in small doses gradually increased up to 30 gr. per diem, though subsequently reduced to half that amount, and during this last treatment progress appeared to be much hastened.

A biopsy was obtained, and microscopically the fat and superficial fascia appeared to be somewhat thicker than usual. The fat appeared whiter and in larger globules, but chemically no change was found. Serous infiltration and increase of connective tissue were absent.

Belonging to the second type probably are two cases occurring in twins, described by Addenbrooke². The condition started in one of them two days after birth, the feet being first affected, and next day the hard waxy swelling had involved the whole body. The other infant was affected next day. One child lived three days, and the other five days after the onset.

Partly interesting in this connection, though more applicable to the scleroderma of adults, are the observations of Alquier and Touchard³. They believe that in an early stage of generalized scleroderma there may be observed around the small blood-vessels

elongated cells of the connective-tissue type, and of the type of mast-cells; as the sclerosis increases the cells diminish in number. This points to perivascular irritation, and coupled with tumefaction of the endothelium and thickening and degeneration of the vessel walls, justifies the hypothesis of blood-intoxication.

REFERENCES.—¹*Lancet*, July 21, 1906; ²*Ibid.* Aug. 4, 1904; ³*Gaz. d. Hôp.* Dec. 28, 1905.

SCLEROSIS OF CEREBRAL ARTERIES.

C. C. Easterbrook, M.D.

W. Russell¹ states that in sclerosis (that is, thickening of the middle and inner coats) of the cerebral arteries, the normal tonic contraction of the muscular coat may, under the influence of injurious substances in the blood arising from toxic absorption from the gut or from defective elimination by the kidneys, be increased (hypertonic contraction, or spasm, or hypertonus), so as to obstruct the circulation locally, and give rise to symptoms resembling those of apoplexy, embolism, or especially thrombosis, but differing in the important respect that they are removable by appropriate treatment. The symptoms produced by cerebral hypertonus are attacks of paresis or paralysis (hemiplegia, monoplegia, or aphasia) without loss of consciousness, or attacks of giddiness, or pains in the head; or in senile subjects, attacks of insomnia, restlessness, excitement, or even delirium at nights. Hypertonus may or may not be associated with atheroma of the inner coat or calcareous degeneration of the middle coat of the arteries, from both of which conditions arteriosclerosis is to be distinguished; and hypertonus may be associated with a strongly- or a weakly-acting heart. It is necessary to remember these associated conditions in the treatment of cerebral hypertonus, which comprises careful attention to the diet, the action of the bowels and kidneys, and the administration of vasodilators, cardiac stimulants or depressants, or hypnotics and cerebral sedatives, according to the circumstances of the case.

REFERENCE.—¹*Pract.* Mar. 1906.

SCURVY (Etiology of).

J. G. Emanuel, B.Sc., M.D., M.R.C.P.

Professor Okada and Dr. Saito¹ have published an account of an elaborate research which they have made into the etiology of scurvy. The main conclusion at which they arrive is that a micrococcus can be isolated from the blood of scorbutic patients, and this they believe to be the actual cause of the disease.

Dr. Neil Macvicar, of Lovedale, Cape Colony², examined into the etiology of 47 cases, 35 out-patients and 12 in-patients, with a view to determining the real cause of scurvy, i.e., whether it is due to the absence of a sufficiency of fresh animal or vegetable food, or whether it is a toxæmia from eating decomposing food, or an organismal infection from such food. All his cases were in natives, and his conclusions, based on a careful history of each, as well as on the effects of treatment (milk, 2 pints daily, fresh vegetables, especially potatoes, fresh meat, and lime juice), were as follows:—

1. The disease common among the natives of his district, known to them as "umtshetsha," is true scurvy.

2. The main cause of the disease is the absence from the diet of fresh food, animal or vegetable. This in some cases was not entirely absent, but present in the diet in insufficient quantity.

3. Muscular exertion precipitates scurvy. Thus, in several cases, though the patients had been living at their homes on a diet lacking in the fresh element, they showed no marked symptoms of scurvy till they commenced active work.

4. Food may be in perfectly good preservation and yet lack the anti-scorbutic power of "fresh" food. Thus men on polar expeditions using tinned vegetables and even lime-juice became scorbutic, but lost their symptoms of scurvy as soon as they had access to "fresh" seal meat.

REFERENCES.—¹*Sei-I-kwai Med. Jour.* vol. xxiv. Nos. 10 and 12, and vol. xxv. No. 1; ²*S. Afr. Med. Rec.* April 25, 1906.

SEBORRHŒA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Dealing with the cure of affections of the scalp in men, Brocq¹ recommends that the hair be cropped quite short, and the scalp treated every night with a lotion of 30 drops of liquid **Pyosulphide of Potassium** in a quarter of a tumbler of hot water. This, applied by small soft brushes frequently washed, may be increased in strength, but if a burning sensation ensues the dose must be lessened. In the morning the scalp is to be rubbed with the following :—

R	Formol.	℥ xv—	℥jss	Alcohol	℥ijss
	Ess. Amygdal.		q.s.		

If the formal is too irritating, use

R	Sod. Biborat. }	℥j	℥ss	Alcohol	℥j
	Æther. Sulph. }			Aq. dest.	ad ℥viiij

When the condition is more severe, the next lotion should be used :—

R	Resorcin	gr. xxx	Glycerin	℥j
	Sulphuris	℥j	Aq. dest.	ad ℥x
	Alcohol	℥jss		

This has to be briskly shaken before use and applied with a piece of wool, and removed in the morning with petroleum ether. If possible it should, however, be left on for four or five nights, and then the head washed with soap.

He recommends this specially for women, but with them the nervous system plays a prominent part, in so far that the constant, minute attention to the hair may constitute a real obsession very troublesome to remove.

Dealing with seborrhœa of the body, he recommends the "**Baume de Duret**," to which the nickname of "sparrow hail" might appropriately be applied :—

R	Picis Liquid.	℥ivss	Sulphur. Præcip.	℥ss
	Ol. Cadin.	℥iv	Borac.	℥jss
	Resorcin	gr. xxx	Glycerin.	℥ij
	Menthol	℥jss	Acetone	℥iiij
	Guaiacol	℥jss	Ol. Ricini	℥jss
	Camphor.	℥jss	Lanolin.	℥iiijss.

This is made by mixing in a closed vessel and warming to 130°, and the claim is put forth that the sulphur combines with other ingredients, while the guaiacol and camphor unite to make an analgesic compound. The ointment is applied by a cotton swab, and it is advantageous to cover it with bandages. One is not surprised to hear that Brocq uses this balm for various other skin conditions equally successfully.

Carle² recommends **Tumenol**, better borne he thinks than sulphur or tar, as useful in seborrhœa (*See ECZEMA.*)

REFERENCES.—¹*Jour. de Méd. et de Chir. Prat.* Feb. 10, 1906; ²*Lyon. Méd.* Nov. 5, 1905.

SEMINAL TRACT (Tuberculous). *Priestley Leech, M.D., F.R.C.S.*

Leveson-Gower Gunn¹ gives the following as points to be remembered: (1) Tuberculous infection may readily pass along a normal vas deferens to the vesicle or prostate; the fact that the vas above a diseased testis feels healthy is no proof that the tubercle has not extended to the vesicles; (2) When both testicles and seminal vesicles are infected, radical treatment alone is likely to be followed by success; (3) When the disease is confined to the seminal tract, it can be completely removed, and that without any great risk to the patient; (4) In all probability the patient is functionally no worse after such an operation than he is after a partial operation on both testes.

There are three different routes by which the vesicles may be reached: Zuckerkandl's, by a perineal incision; Kraske's, by removing a portion of the sacrum, pulling the rectum to one side, and so exposing the base of the bladder; and Young's, by a large T-shaped incision through the lower part of the abdominal wall, dividing both recti muscles, and getting at the bladder in this way. In several genito-urinary works advice is given not to operate on tuberculous vesicles unless they suppurate. Gunn tried the perineal route on the cadaver, and found it very difficult to reach them. He operated on two patients by Young's method with success.

REFERENCE.—¹*Lancet*, June 9, 1906, (For description of Young's operation, see C. A. K. Ball, *Trans. Royal Acad. Med. in Ireland*, 1904).

SHOULDER-JOINT (Inflammation of). *Priestley Leech, M.D., F.R.C.S.*

E. A. Codman¹ calls attention to a cause of stiff and painful shoulders which has attracted little attention, viz., inflammation of the sub-deltoid bursa. The roof of the bursa is formed by the periosteum beneath the clavicle, the coraco-acromial ligament, the acromion, and the upper part of the fibres of origin of the deltoid muscle. Its base is formed by the tuberosity of the humerus and the tendons of the short rotators, which are inserted into the latter. The causes of bursal inflammation are the same as those of arthritis, viz., injury, rheumatism, gonorrhœa, tuberculosis, etc. Prolonged fixation of the arm, as after amputation of the breast, may be followed by adhesions in the bursa. The symptoms vary from discomfort in raising the arm to firm fixation.

When the inflammation is acute, the shoulder-joint is fixed by reflex spasm, but slight rotation and abduction of the arm are always possible, because this degree of motion does not call into play the inflamed bursa. There is local tenderness, and pain is a constant symptom, especially worrying at night. Its distribution is peculiar: it is felt down the arm in the area of the external or internal cutaneous nerve. The diagnosis from arthritis of the shoulder-joint is determined by the persistence of a slight degree of painless motion. Palpation in the axilla is painless. The treatment is rest in a special form of splint, which allows the arm to be held at right angles to the body in internal rotation and abduction. A substitute is to seat the patient at a table, and let him rest his arm on a pillow. Codman condemns the use of a sling. Passive motion should be begun as soon as the pain will admit. He suggests that stiffness of other joints may be due to bursal adhesions.

REFERENCE.—¹*Boston Med. and Surg. Jour.* May 31, 1906, quoted in *Lancet*, June 30, 1906.

SINUSES (Diseases of).

P. Watson Williams, M.D.

ANTRAL SUPPURATION.

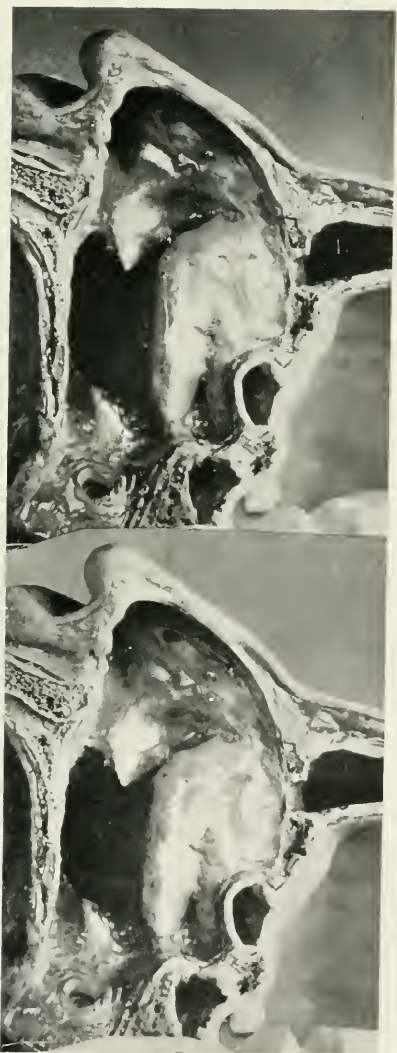
ETIOLOGY.—In a research by Lewis and Logan Turner¹, amongst much that is interesting rather from the standpoint of the pathologist, the evidence is fairly conclusive in favour of the antral infection being most frequently through the nose and not through diseased teeth, although some cases are shown to be dental in origin.

The possibility of antral suppuration (*Plate XII*) being secondary to malignant disease involving the walls of the antrum should be borne in mind: equally important is it to remember that tertiary syphilis may involve the antrum, since the association of antisyphilitic medication with any necessary operative methods is essential to recovery. That syphilis is not so seldom a cause as is often believed is well brought home by instances recorded by Abraham², who reports four cases, one of which, however, appears to be that of ordinary antral suppuration in a formerly syphilitic patient. In the other three cases the antral disease was associated with other tertiary manifestations, e.g., gummatous infiltration of the pharynx, the septum, or the alveolus. The association of syphilitic necrosis of the bony septum or of the inner alveolar wall, with or without gummatous infiltration and tertiary syphilitic ulceration, should lead to the suspicion of syphilis, and when bony necrosis exists, the intensely foul odour of the secretions is in itself a guide. The administration of iodides should precede any radical operative measures, which during active syphilitic manifestations are likely to be badly borne and disappointing in result unless such medication is adopted.

The writer has found that unusual stickiness of the mucopurulent secretion in nasal accessory sinus disease is suggestive of syphilis, although there may be no other evidence or obvious tertiary lesions discoverable.

PLATE XII.

WATSON WILLIAMS ON ACCESSORY SINUS DISEASE.

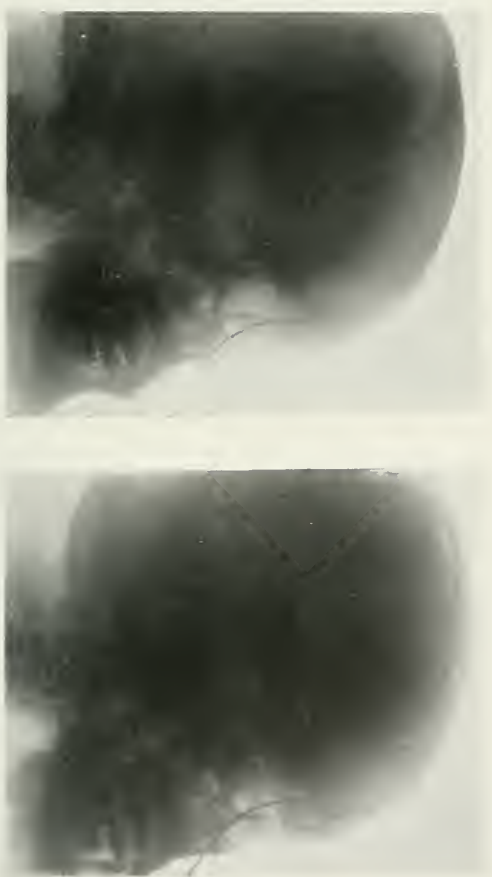


Radical operation on the maxillary antrum, which has been freely opened into the nasal passages by removing the inner wall and part of the inferior turbinate body. In this case the middle turbinate body has been left intact. *It is indebted to Messrs. May & Meeker for permission to reproduce this stereogram.*—P. W. W.

PLATE VII.
FRONTAL SINUSITIS.



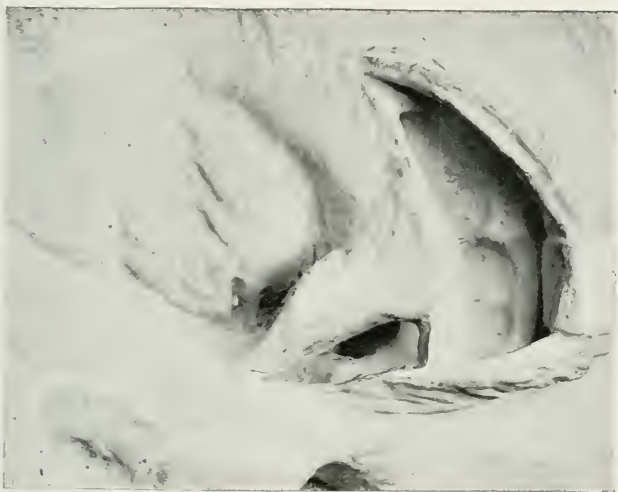
PLATE XIV.



Stereoscopic skiagram showing lateral view of frontal sinus and maxillary antrum. A frontal sinus catheter has been passed into the left frontal sinus. P. WATSON WILLIAMS (CASE).

PLATE XV.

KILLIAN'S RADICAL OPERATION ON THE FRONTAL SINUS.



We are indebted to Messrs. Haver & Miller for permission to reproduce this and the following stereogram. P. WATSON WILLIAMS.

PLATE XVI.

KILLIAN'S RADICAL OPERATION ON THE FRONTAL SINUS.

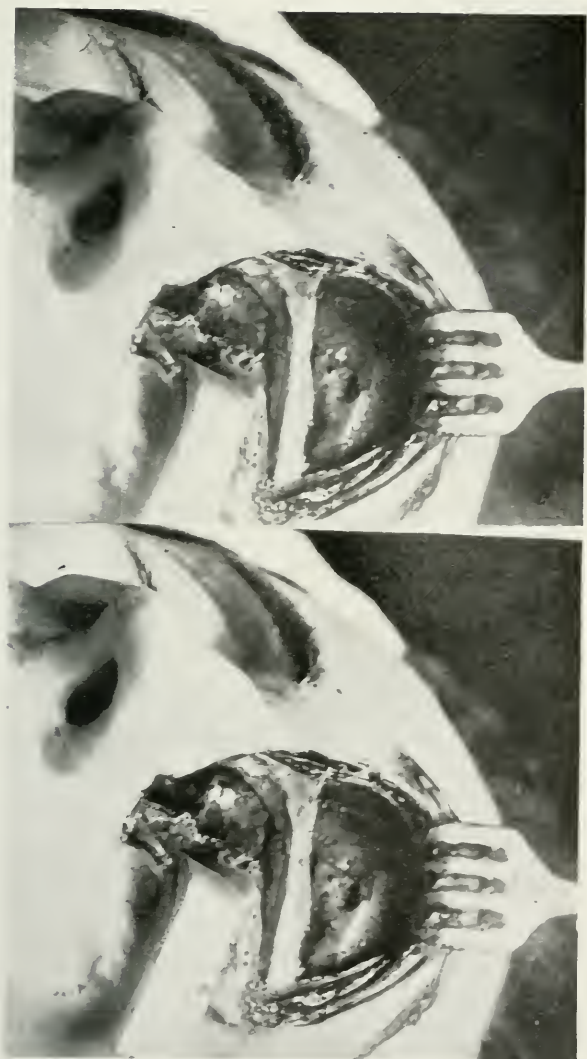
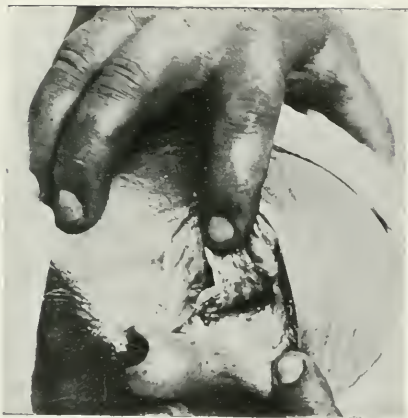


PLATE XVII.

DELSEAUX'S OPERATION



The incision made and the soft parts retracted. The periosseum is reflected from the nasal bones and the anterior and inferior walls of the frontal sinus. Photo by Prof. DELSEAUX.

PLATE XVIII.

DELSEAU'S OPERATION.



The anterior wall and the floor of frontal sinus and the nasal bone, the nasal process of the superior maxillary bone, and the fronto-ethmoidal cells have been removed. Photo by Prof. Delseaux.

PLATE XIX.

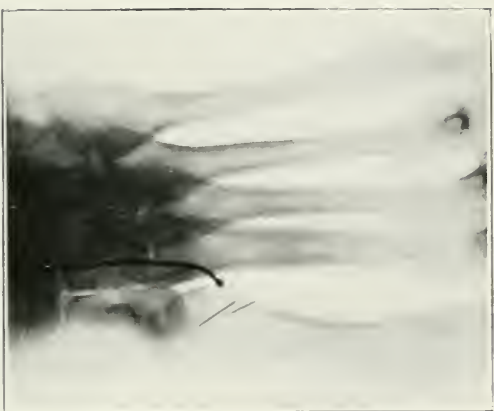
DELSEAUX'S OPERATION.



The operation completed. Photo by Prof. Delseaux.

STEREOSCOPIC SKIAGRAM BY JAMES MACKENZIE DAVISON, Esq., M.B., C.M.

To demonstrate the advantage of Stereoscopic over single X-Ray pictures.



A single skiagraph had been taken of the foot, and operation done for the removal of the pieces of the needle, it being believed that the fragments were situated above the metatarsal bone. The needles could not be found. The patient was brought to Mr. Mackenzie Davison, and the *Stereoscopic X-Ray* photograph showed that the bits of needle were *inside* the bone, near the point of the probe. A piece of bone was chiselled away, and the fragments of needle successfully removed. In the above pictures the probe was placed in its position through the operation wound, and with a stereoscope the true relative positions of the parts can be clearly seen.

FRONTAL SINUS SUPPURATION.

Although the prominent symptoms in patients suffering from frontal sinus disease are usually due to the suppuration in this particular sinus, it seldom if ever happens that suppuration is confined to the sinus in question, for while the antrum is very usually involved secondarily, the fronto-ethmoidal cells are practically always implicated.

The DIAGNOSIS of frontal sinus suppuration presents many difficulties; but when a patient suffers from recurrent supra-orbital pain it should be suspected if the pain is periodic and associated with purulent discharge from the nose anteriorly, especially if the acute pain is relieved with the onset of discharge, and is accompanied by marked tenderness on pressure over the internal angle of the orbit. But in many cases of antral empyema, supra-orbital neuralgia is marked, and is relieved with the escape of pus from the antrum. It is therefore necessary to exclude the antrum as the common source of the escaping pus and the pain. Any doubt as to the antrum being the source of pus may be removed by washing out the antrum, cleansing the nasal passage, and then observing whether the pus appears within a few minutes in the region of the anterior end of the hiatus semilunaris beneath the anterior end of the middle turbinated body. If pus appears within a few minutes it clearly cannot be overflowing from the emptied antrum, and must come from the frontal sinus or the anterior ethmoidal cells. But, often enough, the pus mostly escapes within the first hour or two after rising in the morning, and only very slowly during the remainder of the day. A frontal sinus catheter, in many patients, may then be introduced and passed up to the sinus, and pus, if present, washed out of the sinus: but when the amount present is small, the result may still be doubtful, for the pus washed down may be coming from ethmoidal cells below the sinus, the sinus itself being free from pus. Moreover, in a considerable number of patients the catheter cannot be passed into the frontal sinus until the anterior end of the middle turbinal has been removed.

Much valuable information may be obtained from skiagraphy of the frontal sinus, viz. :—

1. The existence of one or both frontal sinuses, and their extent in an upward or outward direction, may always be determined before operation. This being known beforehand removes the fear on the part of the operator of trephining to open a sinus which may not have developed and is practically non-existent, and when they are fully formed permits fearless entry above the supra-orbital ridge.

2. The position of the septum may be determined, and as one sinus may be very large and extend well over to the opposite side, the other sinus being small and undeveloped; the symptoms which may have suggested double sinusitis will be accounted for, when in fact only the one large sinus may call for interference.

3. Any doubt whether the frontal sinus catheter had failed to enter the sinus may be cleared up at once.

4. The diagnosis of frontal sinus suppuration may sometimes be made from the skiagram alone, and in many cases the diagnosis may be confirmed and sometimes refuted by the aid of a good skiagram. The existence of suppurative disease in a sinus can only be determined by the fogging which the presence of pus causes, as compared with the clearness of detail and in the outline of the healthy sinus or other areas of the skiagram, for such clearness of detail elsewhere demonstrates that the fogging is not due to a faulty skiagram. It must be remembered that skiagraphy of the skull presents many difficulties, and hence any general indistinctness of bony outline renders the plate useless for diagnosing the presence of pus in a cavity. This, however, does not apply to the existence, size, and form of the frontal or other sinuses, which the skiagram may make sufficiently plain.

5. The determination of the size of the frontal sinuses may prove valuable as a guide to treatment, e.g., if a female patient is seen to have very large sinuses the risk of marked cosmetic disfigurement is much more serious than when the sinuses are seen to be small in superficial extent and in depth; and while one might not hesitate to urge radical operation in the latter case, it might be a much more serious and momentous matter for consideration if the sinuses were large.

The writer has utilized the advantages of skiagraphy for several years. One of the earliest cases is shown in *Plate XIII*, taken by Jas. Taylor at the Bristol Royal Infirmary. Latterly, in addition to Taylor's work, he has had the advantage of Mackenzie Davidson's help, especially with the stereoscopic skiagram presented (*Plate XIV*), and of Ironside Bruce. In America, Mosher, of Boston, and Coakley, of New York, have done much to illustrate and emphasize the great value of skiagraphy in the diagnosis and treatment of sinus disease.

TREATMENT.—Irrigation of a suppurating frontal sinus may sometimes succeed in curing the condition, and is usually worthy of trial, not because it is likely to be successful, but because the radical operation is dangerous, and one never can tell beforehand how much deformity may result, or how many complicating factors may be revealed only after the operation is begun. There is a very good reason why irrigation is rarely successful, in that the frontal sinus, often as it is the seat of inflammatory disease and suppuration, owing to the favourable position of the frontonasal channel for drainage, generally drains and cures spontaneously unless anatomical conditions make this impossible. Thus, if the anatomical conditions permit of irrigation, it is rare to find a chronic sinusitis, and where, with a fairly patent frontonasal duct, natural drainage has failed to prevent the sinusitis becoming chronic, it is usually due to pathological conditions which will render irrigation futile. Nevertheless irrigation may succeed. The writer has had successful results in more than one case; others are recorded by Waggett³ and Tilley⁴. Dundas Grant has devised graduated frontal sinus catheters for dilating the infundibulum, and the writer has also used very similar catheters for the same purpose.

Radical Operation.—The design of the modern radical operation is

to remove the whole of the diseased tissues of the frontal sinus, and the fronto-ethmoidal cells, to secure free drainage into the nasal passages, and to obliterate the frontal sinus with as little disfigurement as possible. The radical operation has been widely practised, and the results justify its adoption in all cases calling for interference when conservative methods have failed to give sufficient relief. The earlier radical operations left such great deformity that, in this country at any rate, it was never received with favour except as a *dernier ressort*. To Killian, of Freiburg, belongs the credit of initiating the cardinal point in the modern operation, viz., the *preservation of the supra-orbital bony margin*, by which the facial defect can to a very great extent be lessened, so as to be even altogether trivial in favourable cases.

The essential features in Killian's operation are shown in a cast from Killian's own dissection (*Plate XV*), and in *Plate XVI*. He saves the supra-orbital margin of bone, and the bridge extending to the root of the nasal bone, but removes the whole of the anterior wall of the sinus and the floor, making a free opening into the nasal cavity by removing the portion of the bony wall below the bridge and in front of the lacrimal groove, and clearing away diseased ethmoidal cells even, when necessary, right back to the sphenoidal sinus. He allows the soft tissues of the supra-orbital flap to sink back against the posterior wall of the sinus, and the orbital fat bulges up to complete the closure of the gap left by removal of the sinus. He leaves the inner third of the wound unstitched, and packs the cavity through it till it is closed by granulation.

In Great Britain Tilley⁵ has operated on a large number of cases, and has modified Killian's procedure, whereby he has been enabled to greatly shorten the subsequent stages of healing. He does not remove the floor of the sinus forming the orbital roof, except so far as to make a free passage into the nose and to remove all implicated ethmoidal cells; but having, like Killian, removed all the diseased mucous membrane of the sinus, cleared away all septa that could interfere with drainage, and followed up and cleared away any small pocket that contains pus, he sews up the external wound at once, so that the patient may be discharged from hospital in a fortnight. Tilley rightly lays the greatest stress on the detection and clearing away of the involved ethmoidal cells, and if the frontal sinus itself be healthy the mucous membrane is preserved. His procedure is well illustrated by one patient in whom, after irrigation had failed to relieve, he opened the sinus and found that although it was comparatively healthy, yet on the floor of the sinus and near its inner end was an ethmoidal cell from which pus exuded when its cavity was probed. There were other cells under the sinus, extending back between the eye to the floor of the sinus as far as the sphenoid. Having made a large opening into the nose and destroyed the cells referred to, he closed the wound at once. The headaches disappeared, and the patient was quickly well.

Richards⁶, after reviewing in detail 15 cases treated by himself, concludes that if external operation becomes necessary, then, in simple

suppuration, not long continued, the procedure advocated by Luc should be followed if the dimensions of the sinus are limited, the fronto-nasal canal is roomy, and the ethmoidal labyrinth is free from suppuration, viz., the simple operation of opening and draining the sinus, with closure of the external wound. In all other cases, especially those associated with ethmoidal trouble, accompanied by the formation of polypi and the probable implication of the sphenoidal or maxillary sinuses or both, some form of obliteration method is required. He directs attention to Lothrop's modification of the Ogston-Luc operation, which he considers has all the advantages of the latter without the danger of recurrence of symptoms of obstruction, and at the same time possesses the advantages of the Killian operation without its resulting deformity. A short incision is made under the inner end of the eyebrow so as to approach the orbital floor of the sinus. The sinus is opened by this route, and the whole of the nasal floor of the frontal sinus is removed, chiefly by means of curettes, thereby taking away all the ethmoid cells situated in the vicinity of the ostium frontale, limited externally by the inner wall of the orbital fossa and internally by the inner wall of the lateral mass of the ethmoid, a part of which is removed. The anterior wall of the sinus remains intact.

Delseaux⁷ has devised a modification of Moure's operation for the removal of malignant growths of the ethmoid, which he resorts to for the radical treatment of multiple sinus suppuration involving the frontal sinus, the ethmoid cells, maxillary antrum, etc.

OPERATION.—Incision.—The eyebrow having been shaved, and the whole region disinfected, an incision is made extending from the centre of the brow along the internal angle of the orbit, descending on the lateral face of the nose till it reaches and terminates at the corresponding nasolabial depression (*Fig. 58*). This incision extends right down to the bone, and copious hæmorrhage ensues, which is arrested before proceeding.



Fig. 58.

First Stage (Plate XVII).—The periosteum is now divided in the whole length, and with a slightly-curved resector is detached upwards and downwards. The edges of the incision are retracted, and the wound sponged to make it certain that all bleeding is arrested. Then the soft tissues over the frontal bone are detached, and the frontal sinus is opened with a gouge through the floor close to the nasal spine. Once the sinus is entered, the opening is enlarged, and the sinus explored by the eye and by probing, a good illumination being, of course, essential.

The lesions present, and the dimensions of the sinus, having been noted, the whole or part of the inferior and anterior walls of the frontal sinus is removed, according to the necessities of the case. The cavity is then packed with gauze.

Second stage (Plate XVIII).—The nasal bone and the ascending process of the superior maxillary bone must now be resected, without, at this stage, opening through the nasal mucosa, so that the blood will not encumber the nasal passages.

The patient's head is depressed and the mucous membrane of the nose elevated as far as possible, the nasal passage being then tamponned. Bleeding being stopped, one then has in front of him the posterior wall of the naso frontal canal, composed of the anterior and middle ethmoidal cells. Of these, sufficient are removed to ensure good drainage from the frontal sinus, and if the



Fig. 59.

ethmoid is diseased, that is extirpated too. But care must be taken to avoid wounding the ethmoidal vessels, which are indicated in *Fig. 59*. At this stage the tampons are changed, and careful exploration is made of the operation cavity. When the suppurating cells have been opened, one cures and tampons afresh, and, according to the case, continues to remove the parts diseased, even until the entire ethmoid has gone. Unless previously removed, one now takes away with cutting forceps the middle turbinated body, and attacks the anterior superior and inner angle of the antrum of Highmore. The interior of the antrum is curetted, and all pyogenic membrane cleared away, including the inner wall and the inferior turbinated body. The whole cavity is then tamponned.

After an interval all the tampons are removed and a last inspection made of the immense opening into the frontal sinus, nasal fossa, and maxillary antrum. Behind, one sees the sphenoidal sinus aperture: if its condition is doubtful this is explored and, if necessary, the anterior wall removed.

The final tamponnade is made with simple or iodoform gauze, packed very lightly, and the end brought out through the nasal orifice.

Lastly, the nose is pressed back in its place, and one proceeds to suture the divided tissues carefully (*Plate XIX*). On the following morning the packing is removed, and in its place a simple gauze tampon is placed within the nasal orifice. The sutures are removed at the end of three or four days, and the nasal passages are smeared frequently with borate and menthol vaselin, the patient being instructed to avoid blowing the nose.

Delseaux has operated thus several times with excellent results, and very little, if any, deformity. In a communication to the author he states that he has operated on two bilateral cases, and in such cases he does not take away the nasal bones, so that, although the

operation is less easy, one avoids the deformity that must result if both nasal bones are removed.

St. Clair Thomson⁸ reports three cases in which spontaneous evacuation took place in the region of the orbit. In the first case, with recent infection, a simple incision into the abscess on the face was followed by a cure. In the second, also of recent origin, the frontal sinus as well as the abscess on the face was opened and drained. The third case, of longer standing, required a Killian radical operation in both frontal sinuses.

SPHENOIDAL SINUSITIS.

The sphenoidal sinus is much more frequently the seat of suppurative disease than is generally supposed, and that it is not rarely the source of cerebral complications is forcibly brought to our notice by St. Clair Thomson⁹. In reporting two cases of his own, he collected no less than 42 cases of cerebral and ophthalmic complications of sphenoidal sinusitis, viz., 17 cases of meningitis, 4 of thrombosis, 12 of thrombosis and

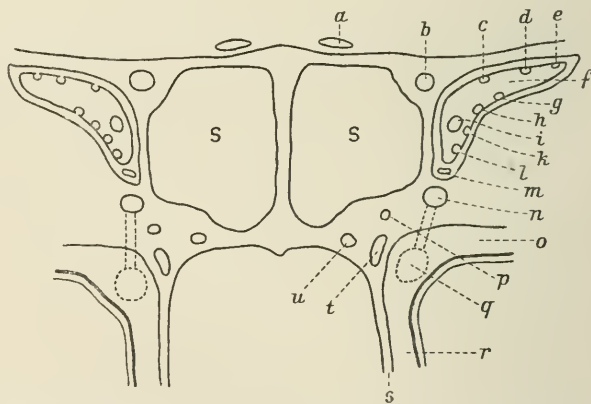


Fig. 60.—Diagram to show relations of sphenoidal sinus in transverse section.

S.S.—Sphenoidal sinuses. *a*.—Olfactory nerve. *b*.—Optic Nerve. *c*.—Fourth nerve. *d*.—Frontal nerve. *e*.—Lacrimal nerve. *f*.—Cavernous sinus. *g*.—Third nerve upper division. *h*.—Nasal nerve. *i*.—Carotid Artery. *k*.—Sixth nerve. *l*.—Third nerve, lower division. *m*.—Ophthalmic vein. *n*.—Foramen rotundum for sup. max. nerve. *o*.—Spheno-maxillary fissure—transmitting sup. max. nerve and orbital branch; Inf. orbital artery; Ascending branches of Meckel's ganglion. *p*.—Vidian nerve and artery. *q*.—Meckel's ganglion. *r*.—Pterygo-maxill. fissure. *s*.—Vertical plate of palatal bone. *t*.—Spheno-palatine foramen for spheno-palatine artery and naso-palatine nerve. *u*.—Pterygo-palatine canal for pterygo-palatine vessels and pharyngeal nerve.

meningitis combined, 1 of intracranial abscess, 2 of meningeal septicaemia, 1 of encysted abscess in the dura mater, 1 of hæmorrhagic encephalitis, 1 of phlebitis of the cavernous sinus, 1 of intracranial hæmorrhage, and 1 of suppurative encephalitis. When it is remembered how seldom the sphenoidal sinus is suspected as the source of disease, and how comparatively rarely it is ever examined, either in life or post mortem, even this long list must comprise but a very small percentage of the cases which have succumbed to lesions starting from

that point. The relations of the sphenoidal sinus to the base of the brain, the orbit, and the cavernous sinus and its contents are well indicated in the diagram (*Fig. 60*), which will explain the variability in degree and seat of pain in many cases of sphenoidal sinus disease.

Without entering into any detailed description of the symptoms of sphenoidal sinusitis, it will be useful to cite Thomson's remarks on the pain that may accompany the affection: "Pain or neuralgia may be absent, intermittent, or severe. Occasionally it resembles migraine. The pain of suppuration in a sphenoidal sinus is not referred to any regular and definite point. It may be frontal, occipital, or temporal. It may even be referred to the side of the head opposite the affected side. Sometimes it is said by the patient to be 'in the ear.' . . . Perhaps the only pain which is characteristic of sphenoidal disease is when the patient states that it is deep in behind the eyes. It may be so intense as to cause complete insomnia. Pain may be entirely absent until the onset of endocranial infection. It is then rarely wanting, is generally acute, but varies much in distribution. This variation doubtless depends on the nerves involved in the extension. It may be on the vertex, at the back of the occiput, or deep behind the eye. The latter is perhaps the only characteristic type. . . . Misleading in practice are the cases in which the pain is distinctly located in some of the other accessory cavities. Thus, in one case it was so fixed in the frontal sinus that the cavity was opened, only to be found healthy. In another case the pain was referred to the maxillary antrum; this was opened and found healthy. . . . Pain behind the ear was complained of in one case, while in no less than five cases it was located in the ear itself. This pain was so marked that in three cases it led to the mastoid being opened, and in each of these cases the operator was a skilled otologist. The symptoms were so suggestive of thrombosis of the sigmoid sinus that this vein was opened needlessly in two cases."

As regards the eye symptoms of thrombosis of the cavernous sinus, they are often the first to suggest the real nature of the disease. "The three chief ophthalmic changes are: (a) Papillary oedema; (b) Chemosis; and (c) Exophthalmos. They develop within 6. 10. 12. or 16 days from the onset of symptoms indicating the spread of infection. There may be anæsthesia, or ulceration of the conjunctiva, or opacity of the cornea. Paralysis of the ocular muscles generally occurs. The condition of the pupils varies. The fundus may be normal in rapid cases or at the commencement. Later there may be congestion of the retinal veins, papillary stasis, papillary oedema, papillary atrophy, or optic neuritis. Vision may be good, or there may be complete blindness."

The value of *stereoscopic* skiagrams as compared with the results obtained by single exposures is well exemplified by *Plate XX*, which Dr. Mackenzie Davidson contributes for the purpose.

REFERENCES.—¹*Edin. Med. Jour.* Nov. 1885; ²*Med. Rec.* Mar. 8, 1906; ³*Jour. Laryng.* Feb. 1906; ⁴*Ibid.*; ⁵*Loc. cit.*; ⁶*Amer. Jour. Med. Sci.* Nov. 1905; ⁷*Rev. Hebd. de Lar., d'Otol. et de Rhin.* 1906; ⁸*Pract.* July, 1906; ⁹*Brit. Med. Jour.* Sept. 29, 1906.

SLEEPING SICKNESS. (*See* TRYPANOSOMIASIS.)

SNAKE POISONS. (*See* SERUM-THERAPEUTICS.)

SPASMUS NUTANS.

Prof. G. F. Still, M.D.

This curious nervous disorder of infants has attracted attention considerably in recent years. It always occurs, according to Zappert¹, before the age of four years; usually it is seen in infants under the age of two.

The characteristic symptoms are rhythmical movements of the head, sometimes vertically as in affirmation, sometimes laterally as in negation, and sometimes in a combined form resulting in a sort of pendulum movement. These movements, described by the present writer², are almost always associated with a very rapid and fine nystagmus, which is peculiar in being more marked in one eye than in the other, and often apparently limited to one eye. The nystagmus may be vertical, horizontal, or rotary. The third symptom, which is specially noticeable, is a curious habit of looking out of the corners of the eyes, with the head slightly averted and the face turned slightly downwards. These symptoms almost always begin between the ages of five and twelve months, hardly ever after fourteen months. According to Meachen³, males and females are equally liable to this affection, but both his cases were males, and of 30 cases reported by the present writer, 19 were boys.

ETIOLOGY.—Meachen (*loc. cit.*) suggests dentition, rickets, and injury as predisposing causes, and quotes Raudnitz's theory that the disorder is due to defective light in the dwelling. This theory has been controverted by the present writer on the grounds that some of these cases live in well-lighted dwellings and have spent much of their time in the open air, and that the curious seasonal incidence—the disorder almost always begins in the winter months—is comparable to the incidence of other nervous disorders, especially laryngismus stridulus, which usually begins in the winter months, and can hardly be attributed to the darkness of the season. Moreover, miners' nystagmus, with which rhythmic movements of the head and trunk are occasionally associated, can hardly be quoted now as supporting the defective-light theory, for it has been shown that miners' nystagmus is due more to position than to any defect of light. The defective-light theory also assumes that the head-nodding is secondary to the nystagmus, whereas in some cases nystagmus does not appear at any time, and in others the head-nodding may precede the nystagmus. It seems clear that the disorder is a functional neurosis, and that it is specially associated with rickets; but apart from this association there is no cause known, unless it be the irritation of dentition, which is made the more probable by the age incidence of the disorder and also by the observed fact that exacerbations are apt to occur with the eruption of fresh teeth.

PROGNOSIS.—Meachen refers to Gunn as finding some relationship between the head-nodding of infants and epilepsy. The present

writer's experience is entirely opposed to this view; amongst 31 cases he has not seen one in which, either at the time or after the disorder had disappeared, any epileptic attack occurred, unless a convulsion, which appeared to be an ordinary infantile convulsion in one case, could be counted as such. Head-nodding appears to exercise no injurious effect, but it seems likely that the children who show this disorder are likely to prove nervous or perhaps eccentric children later on; it certainly does not tend to cause imbecility. The symptoms very rarely persist beyond the end of the second year.

TREATMENT.—Meachen states that the movements almost always yield to **Bromide**. The present writer (*loc. cit.*) considers **Phenazone** more valuable than bromide in these cases. At six months old half a grain, and at one year old one grain can be given. In some cases a combination of bromide with **Cod-liver Oil** seems to give excellent results: perhaps on account of the antirachitic effect of the oil. It is important that the infant should be kept out in the open air as much as possible. **Cold Douches** are also useful means of reducing the nervous instability of the rickety infant, and therefore likely to do good in this disorder.

REFERENCES.—¹*Jahrb. f. Kinderh.* July 1, 1905; ²*Lancet*, July 28, 1906; ³*Brit. Jour. Child. Dis.* 1905, p. 278.

SPHENOIDOL SINUSITIS. (*See SINUSES, DISEASES OF.*)

SPINAL CARIES (Without Bony Deformity). *Purves Stewart, M.D.*

In most cases of Pott's disease the diagnosis is established by the presence of characteristic signs in the vertebral column, and especially by the existence of an angular curvature, or in less severe cases, by the occurrence of localized bony tenderness on pressure, or percussion over the spines of the affected vertebræ. The pain of Pott's disease is increased by movement and relieved by rest, and ordinarily there is a degree of contracture of the spinal muscles, owing to the patient's instinctive endeavour to immobilize the spine when in the erect posture. Both the angular curvature and the osseous pain are due to disintegration of the bodies of the vertebræ. But when disintegration does not occur, these diagnostic signs are absent. This is rare in children, but by no means uncommon in adults, whose bony tissues, being more compact, are less easily destroyed than in the case of a child. In the absence of spinal deformity and of osseous pain, we have to depend for our diagnosis upon other signs, which, as Alquier¹ has emphasized, may be grouped into two classes: firstly the signs of abscess, and secondly the signs of implication of the spinal cord and spinal roots.

The signs of spinal abscess are familiar. The other group, resulting from cord changes, is perhaps less commonly recognized. In such cases the pathological process consists mainly in a deposit of tuberculous material on the posterior aspect of the vertebral bodies, between them and the front of the spinal theca. It is important to recognize this condition before the appearance of an angular

curve, the development of which may be delayed sometimes for months or years.

There is a prodromal stage characterized by the occurrence of root-pains, corresponding to the level at which the theca is compressed and irritated. These pains are generally bilateral, though not always symmetrical. The root-pains of latent Pott's disease are intermittent, occurring in paroxysms, and are not unlike the lightning pains of tabes. In a small proportion of cases the pains may be unilateral, perhaps in the lumbosacral roots, and the condition is then readily mistaken for a sciatica. The root-pains of Pott's disease are generally relieved by rest and aggravated by the erect posture and by movement. Therefore, if we confine the patient to bed and find that his root-pains rapidly improve, this is a fact of considerable diagnostic value. The site of the pains corresponds to the site of the spinal disease, though sometimes a comparatively narrow zone of disease may cause widespread pains, probably by a process of congestion of neighbouring roots, without actual tuberculous infiltration.

Concurrently with the root-pains, or shortly after them, the spinal cord itself becomes compressed. We then have superadded medullary signs and symptoms. These consist in spasticity of the lower limbs, with increased deep reflexes, extensor plantar reflexes, and affection of the sphincters. In severe cases the patient may become anæsthetic in the lower limbs and trunk, up to the level of the lesion. The motor phenomena, however, usually predominate over the sensory, probably owing to the fact that the pathological lesion is situated in the anterior part of the cord. When compression becomes so complete as to produce an anatomically transverse lesion, the paraplegia becomes flaccid in type, with absence of deep reflexes, but still with extensor plantar responses in the toes. This condition of total transverse lesion is probably most often due to a superadded transverse myelitis at the level of compression. When the anæsthesia is of the "dissociated" type (i.e., where pain and temperature-sense are more affected than tactile sensation), this indicates a central destructive lesion of the cord rather than a mere compression, and increases the gravity of the prognosis.

In the diagnosis of Pott's disease without spinal deformity, we have several conditions with which it may be confounded. Firstly, there is the possibility of meningeal inflammation attacking the roots and producing root-pains, or tabes with its well-known root-pains. Both of these conditions can be differentiated from Pott's disease by examination of the cerebrospinal fluid. In meningeal inflammation of any sort, and in tabes, we constantly find an excess of leucocytes in the fluid, whereas in Pott's disease the fluid is normal, inasmuch as the tuberculous process is outside the theca. Another diagnostic point is the effect of rest in bed. In Pott's disease, rest produces, as a rule, a marked improvement, whilst the erect attitude aggravates the pains. Syphilitic disease of the cord or meninges is also accompanied by a lymphocytosis of the cerebrospinal fluid.

In addition, we have other positive signs and symptoms in Pott's disease. Firstly, there are the general phenomena of tuberculous infection, such as asthenia, emaciation, fever, night-sweats. If these phenomena precede the symptoms of spinal cord disease, they are of great significance. Secondly, there are the signs of actual spinal disease. We should carefully examine the vertebral column for evidence of rigidity, though if the disease be in the dorsal region in an adult, this may be almost impossible to detect. Tenderness of the bones is significant if localized, but of little value if diffuse.

REFERENCE.—¹*Gaz. d. Hép.* May 19, 1906.

SPINAL SURGERY.

Priestley Leech, M.D., F.R.C.S.

Spinal Anæsthesia.—During the past year many articles have been published on this subject, and, as is generally the case, the majority are from abroad, where this method of anæsthesia seems to find more favour than in England.

George Chiene¹ has practised spinal anæsthesia in 14 cases with **Stovaine**. Stovaine is hydrochlorate of amylene, and was so named by Fourneau, a French chemist, in 1904. It is extremely soluble in water, and has some antiseptic properties. Aqueous solutions can be boiled without interference with its action; solutions slowly decompose when heated to 120° C. in an autoclave, but can withstand a temperature of 115° C. for 20 minutes. It slows the pulse, and induces contraction of the pupil; it does not cause pallor, but often flushing; there is no dyspnœa, oppression, uneasiness, or excitement, and no tendency to syncope. In some instances it is just as efficient as cocaine; in others nearly so. It is most certainly much less toxic, and therefore can be given in larger doses if required. As regards after-results, there is usually a slight rise of temperature, which may last for some days; there is little tendency to sickness or vomiting; headache and spinal neuralgia are rarely present or only slight. The general condition is good, and the patient can enjoy an ordinary meal. The dose used ranges from 2 to 8 or 10 cgrams. Chiene has used Tuffier's solution, 10 per cent of stovaine in sodium chloride; this is supplied by Billon in ampuls, one of which contains $\frac{1}{2}$ cc., representing 5 cgrams of stovaine. Chiene has used Taffier's needle with an all glass syringe, which can be boiled. If it be boiled with other instruments, care must be taken to remove all traces of soda from the syringe and needle. The lumbar region is prepared as for an operation, and the skin again purified when in the theatre; failures are due rather to faulty technique than to the method. When about to inject the drug, the needle is first fixed to the syringe, an assistant breaks the ampulla, the needle is inserted, and the required amount of fluid drawn into the syringe. Remove the needle, and lay the syringe carefully down on a sterilized towel. The patient bends as far forward as possible. Tuffier's line is found by ascertaining the position of the highest points of the iliac crest and drawing an imaginary line between them; this line crosses

the spine of the fourth lumbar vertebra. The needle is inserted about 1 cm. from the middle line at a slightly lower level, inwards and forwards, for a distance varying from 5 to 7 cms., depending on the muscularity of the subject. With the patient in this position (sitting up), the instruction which is sometimes given to pass the needle upwards is, Chiene thinks, misleading. One knows at once when the needle passes through the tough ligamentum subflavum, and on passing the needle a little further the cerebrospinal fluid should escape. The syringe is then fitted to the needle and the piston withdrawn, thus mixing the solution with cerebrospinal fluid. The combined contents are then slowly injected, the needle is rapidly removed, and the puncture sealed. If the needle strike bone, it must be withdrawn and a fresh puncture made at a different level. If a vein be punctured, a fresh needle should be introduced at another point. The needle may enter the spinal canal and no fluid escape; in this case the needle is probably blocked, and a stilette should be passed along it.

If the injection be successful, the patient in a few minutes will begin to feel a condition of pins and needles in the legs, or he may complain that his lower limbs are going to sleep. The patient is unable to lift his leg off the table, and in about seven minutes sensation to pain is lost, although sensation to touch remains. The anæsthesia commences in the perineal region, then affects the toes and feet, and passes gradually up the limb; it disappears in the reverse order. The height and duration of anæsthesia depend as a rule on the amount of the drug injected. In 2 cases out of 14 Chiene failed to reach the canal, and in another case the needle entered the canal, but, owing to blocking of the needle, he was unable to make the injection; in 3 other cases chloroform had also to be administered, owing to an insufficient dose having been given. The field of operation is screened from the patient's sight. The only abdominal cases operated on were radical cure of inguinal hernia.

Barker² reports a case of amputation of the thigh under stovaine spinal anæsthesia. An embolus had blocked the bifurcation of the aorta, leading to gangrene of one leg.

Dean³ says that his experience of stovaine anæsthesia by intraspinal injection in acute general peritonitis has impressed him profoundly with the great value of this anæsthetic. He gives the notes of 6 cases, 4 of which were for abdominal conditions. He thinks it is better to have trocars and cannulas of varying lengths, suitable for men and women. To meet cases where the operation is prolonged beyond the period of anæsthesia produced by a single injection, Dean has arranged his apparatus so that the cannula can be left in during the whole of the operation, and a further small dose can be inserted without hurting, or indeed scarcely moving, the patient. He suggests that any recurrence of pain or abdominal distension in abdominal cases might be dealt with by another dose of stovaine. In one case of septic peritonitis which died, there was some paralysis of the lower intercostal muscles due to the stovaine, but it was thought that this

did not contribute to the fatal result. It is well, however, to bear this in mind, and also the fact that as a rule the anæsthesia does not extend much above the umbilicus. In stovaine intraspinal anæsthesia, the patient is largely protected from surgical shock.

Heresco and Strominger⁴ made injections in 11 cases of genito-urinary diseases. In 10 they obtained sufficient analgesia to perform the operations; the failure was due to faulty technique. They had some accidents, though not serious enough to place the patients' lives in danger.

M. le Filliatre⁵ gives his experience of 452 operations under intraspinal anæsthesia. He was at first discouraged by his results, but found that, by removing some of the cerebrospinal fluid before injecting the cocaine, the results improved. He prefers puncture in the fifth lumbar space to that of the fourth, as there is more room. He punctures half an inch to the right, below and outside the fifth spinous process, and he holds the needle with its point directed upwards and inwards. He uses **Cocaine**, an aqueous solution of 1-50, sterilized for twenty minutes at 120° C. in a water oven and sealed up in bulbs holding 3 cc. The amount used for injection is 2 cc. Stovaine was used in some cases, but was not satisfactory, either at the time or afterwards.

Wayne Babcock⁶ says it is not surprising that rachicocainization in general has met with disfavour. The addition of adrenalin or epinephrin to the cocaine solution has diminished the risks, but unpleasant sequelæ occur in many cases. Of the newer anæsthetics, stovaine, alypin, and novocaine have been tried. Babcock has tried stovaine in sixty-five cases, including operations on the lower half of the abdomen, and operations on the rectum and lower extremities. Some anæsthesia was obtained in every case, but at times it was incomplete, and another anæsthetic seemed desirable. For the most part the injection, even in children, caused little disturbance; the patients were calm and the anæsthesia was satisfactory.

The dose for an injection of stovaine in adults varies from 3 to 7 cgrams; quantities below 3 cgrams are likely to give rise to a patchy anæsthesia; doses of 3 to 4 cgrams usually give satisfactory anæsthesia for operation upon the legs, perineum, or rectum. Anæsthesia of the abdomen rarely extends above the level of the anterior superior iliac spines, and a dose of 5 to 7 cgrams seems desirable for herniotomies and appendectomies. Nausea, pallor, and cardiac oppression are not uncommon after the injection of 7 cgrams. For abdominal operations the method is less certain and reliable than for operations at a lower level. In one case death occurred after the intradural injection of alypin, but probably death would have occurred whatever anæsthetic had been used, as the patient was a debilitated alcoholic, with chronic nephritis and œdema of the lungs. Nevertheless, great caution should be used in the intradural administration of synthetic anæsthetics of doses of above 4 cgrams in patients with marked cardiac or circulatory depression. It is better to dilute the solutions of stovaine; apparently,

injections of a 10 per cent solution have such a high specific gravity that they tend to sink to the lower part of the spinal canal, and there is little evidence that they diffuse upwards. The injection of 3 cgrams of stovaine in a 2 to 4 per cent solution is apparently more reliable than the injection of 5 cgrams in the form of a 10 per cent solution. This is attributable to the greater bulk and diffusive qualities of the lower dilutions. In herniotomies and abdominal operations it is preferable to decompress the cord by allowing the escape of one or more cubic centimetres of cerebrospinal fluid, or until the rate of flow from the needle is distinctly reduced. Dilution and decompression may increase the liability to cerebral or bulbar symptoms, and have less value in operations below Poupart's ligament.

Babcock has employed **Stovaine** with an addition of **Adrenalin Chloride**, **Adrin**, and **Epinephrin Borate**. The addition of the suprarenal element seems to prolong the action and to increase the safety of the larger doses of stovaine, but may limit and interfere with the completeness of the anæsthesia. The preferred site of puncture is the second lumbar interspace; injections through the third or fourth lumbar interspace seem to give less uniform results, apparently from failure of the stovaine to diffuse upwards; while injections above the second lumbar spine are associated with risk of injury to the cord. After injection, the patient is placed with his head raised; if he shows pallor, or complains of oppression of the chest, nausea, or numbness of the hands, the head and shoulders are still further raised. Usually motor paralysis is present, and occasionally both tactile sensation and motion are preserved, although neither the incision nor the cautery causes pain; the retention of the tactile sense may mislead the surgeon into belief that anæsthesia is not present. It is best not to interrogate the patient, and desirable that the operation be completed before he realize that it has started. Shock is diminished under this method of anæsthesia, and it seems especially suitable for those terrible crushes of railway accidents. Great care must be taken against any risk of sepsis, and before introduction of the needle the skin may be frozen with ethyl chloride.

Professor König⁷, of Altona, has courageously published a case where permanent spinal paralysis resulted from the injection of stovaine for suture of a fractured patella. The morning following the operation the patient had complete paralysis from the umbilicus downwards, for motion and sensation; the tendon and skin reflexes were increased. No alteration occurred, except that two days later the paralysis progressed as far as the diaphragm and embarrassed the respiration. Headache, malaise, vomiting, and fever showed themselves. No growth of bacteria was found in the fluid drawn off. He died three months later. Post mortem it was found that the dura was adherent to the cord from the ninth spine downwards; the spinal cord was normal in the upper portion, but in the lumbar region it was softened, and on section it appeared to be like pus.

Paul Roeder⁸ reports two cases where paralysis of the ocular

abductor of the left eye occurred after intradural injection of stovaine. Both patients were previously free from nervous symptoms, and the paralysis passed off in one case on the twelfth day; in the other case its disappearance was longer and more gradual.

Ed. Deetz⁹ gives a list of 360 cases of operation which were anæsthetized with a mixture of **Adrenalin** and **Stovaine** (prepared by Billon) in Dr. Müller's Rostock clinique. Six patients were anæsthetized three times (one of them three times in one week), and 23 patients twice. The ages varied from seven and a half (14 cases) to over seventy (13 cases) years old. In pyæmia and other acute infectious diseases the use of intradural anæsthesia is contra-indicated. In 52.6 per cent of the cases there were noticed sequelæ, either during the operation or afterwards. Only one case died after an injection, an old man of 72 years suffering from acute peritonitis. Headache was noticed pretty frequently: in one case it lasted over six weeks. A feeling of stiffness and objective spinal rigidity was noticed in several cases among the first hundred, but it soon disappeared, and it was thought that the syringe had not been thoroughly cleaned from the soda solution in which it had been boiled. Nine operations were satisfactorily performed on the thorax. Out of 126 operations on the lower extremities, 4 needed a narcotic; and in 23 cases of abdominal operations, ether, gas, or chloroform was needed.

Neugebauer¹⁰ publishes the results of intradural injection of **Cocaine** in 79 operations on the rectum and anus; in many cases the anus becomes patent, and even widely dilated after the injection. (The same thing has been noticed after the injection of stovaine).

Preindlsberger¹¹ and Fuster¹² report 292 and 235 cases operated on after intradural injection of tropococaine.

Prof. Opitz¹³ was first induced to try spinal anæsthesia by the danger of prolonged narcosis in severe operations. In 25 gynæcological operations he has used a 5 per cent solution of **Novocaine**, with an addition of suprarenin; for rectal operation 2 cc., and for laparotomies 3 cc. of this solution are used.

Brunner¹⁴ has also used novocaine in gynæcological operations, but is inclined to reserve it for those cases where a general anæsthesia appears dangerous.

Donitz¹⁵ prefers stovaine with suprarenal extract; he reports 407 cases of spinal anæsthesia, 102 of these being with stovaine. The failures were either an anæsthesia limited to one half of the body, or an imperfect anæsthesia: it was rarely totally absent. In the middle line of the cauda equina there is a large lymph space into which the conus medullaris extends, and the needle should enter this space. If the needle is at one side among the nerve bundles, the anæsthetic will travel along them and not across, and a unilateral anæsthesia result. If the spinal fluid only drops from the cannula, this should be reinserted until it enters the central space, when there will be a free flow. It is best to inject with the patient in a sitting posture, leaning forwards, and then to place the patient on his back and raise his buttocks, thus

causing the anæsthetic to bathe the posterior or sensory roots. Above the second lumbar vertebra is the position of choice for injection ; the fluid injected should be isotonic with the spinal fluid, or the salt should be dissolved in the spinal fluid.

Robert Jones¹⁶ reports two successful cases, one of excision of the hip in an old man in whom an attempt at giving chloroform had nearly ended in death, and another in a patient who would not take chloroform.

Dr. Varvaro¹⁷ gives notes of several cases operated on by intradural injection of stovaine.

Abscesses in Spinal Caries.—T. H. Kellock¹⁸ thinks that these should not be regarded as abscesses ; they are merely a collection of broken-down tuberculous material, and as a rule they increase in size from infection and subsequent breaking down of the surrounding tissues, and only a small proportion of the fluid comes from the original carious spot. These abscesses themselves are comparatively harmless to the health of the patients, and it is only when septic infection is superadded that danger arises. There is probably always some breaking down in spinal caries, but if small in amount it gets well by itself. As regards treatment, they should be treated as collections of tuberculous material and not as septic abscesses. If the patient's condition is good, the following general principles should be observed. The abscesses should be **Opened Early**—through the **Thickest Layer of Healthy Tissue** available—that, is while they are deeply situated. They should *not* be opened in places where the skin is implicated or in the most prominent and inviting positions where they are nearest to the surface. The reason for this is, that one wants the largest amount possible of unaffected tissue to bring together afterwards and form a barrier between the interior of the cavity and the surface of the body. For the same reason, openings should be made through rather than between muscles. After the abscess has been opened by deliberately dividing the overlying structures layer by layer, its contents are evacuated, the granulation tissue lining its walls gently scraped away, the cavity irrigated, and then thoroughly dried. Where the patient's general condition is not good, and seems capable of improvement, it is sometimes wise to delay operation.

Closure should be done with care ; the structures last divided should be first accurately sewn, and the skin wound last. It does not matter what solution is used for irrigation, and it is better, perhaps, not to leave iodoform and glycerin in the cavity, nor to wipe the walls with strong carbolic acid or solution of chloride of zinc, as it leads to discharge of fluid from the walls. Adrenalin may be used. Drainage is to be avoided, even for twenty-four or thirty hours. If fluid collects after operation, remove it by aspiration, passing a fine needle into some part of the surface other than that involved in the wound. If it collects after a week or more, a second operation may have to be done ; if possible it should not be done through the same incision ; if this is impossible, the first scar should be fairly widely excised.

Occasionally the operation may have to be repeated three or four times. Care must be taken to give the disease in the spine the best chance for becoming quiescent.

In the *ilio-psoas variety* it is a mistake to open in the loin, even if presenting there, as with an incision in the back the fluid would infiltrate the incision and infect it before it had time to heal, whereas if they are opened in front, with the patient lying on his back, the incision has a chance of becoming united before the fluid can come in contact with it should this recur. The incision in this variety is generally made close to Poupart's ligament. The muscles are split, and the peritoneum is pushed upwards and inwards, and by the aid of retractors a good view of the bulging iliac fascia should be obtained. This fascia should be incised, and care taken that the upper end of the incision is not hidden under the subperitoneal fat, as it may lead to incomplete closure of the incision and subsequent leakage. The edges should be retracted, and not held with forceps, as this may lead to necrosis and subsequent infection. After cleaning and drying the cavity, the opening in the iliac fascia should be most carefully sutured : a few sutures inserted to approximate the split muscles, and the skin incision be completely closed. The same treatment without drainage should be applied to retropharyngeal abscesses which can be approached from the side of the neck. When an abscess has formed in connection with disease of the lower cervical or upper dorsal vertebræ, it is better to leave the abscess alone for a time ; but if symptoms are serious, something must be done. The lower cervical may be approached in the lower part of the neck by an incision behind the sternomastoid, but the operation is difficult. Another method is the performance of laminectomy, drawing the spine aside and trephining the caseous body of the vertebra, but this has little to recommend it unless there are signs of pressure on the spinal cord. The third, and on the whole the best method, is by making a longitudinal incision in the back at a distance from the mid-line, removing the head and neck of one or more ribs, and approaching the abscess from the side of the body of the vertebra.

Spinal Tumours.—R. H. Harte¹⁹, of Philadelphia, has collected particulars of 92 cases of operation for spinal tumours. Of these, 43 patients died, a total mortality of 47 per cent. If the cases, 17 in number, ultimately known to be fatal, but in which death ensued some weeks or months later, be omitted, the mortality is reduced to 26 cases, or 28 per cent. Even with a mortality of 30 per cent he thinks the surgeon should not hesitate to operate, since, when a cure cannot be obtained, relief from pain is almost invariably secured, and the patient in most instances lives as long as he would have done if no operation had been performed. The nature of the tumour is recorded in 88 of the cases. It was sarcomatous in two-fifths of the whole number (37 cases) ; adhesions, thickenings, etc., hold second place. Of the 49 patients who survived the operation for some weeks or months, no less than 29, or 59 per cent, recovered their functions

sufficiently to be classed as cured ; 17, or 34 per cent, could be classed as improved by the operation ; while in only 3 patients, or 6 per cent, did the operation effect no change in their condition. Harte thinks that there must be some error in the microscopical diagnosis of some of the cases of sarcoma. It seems from this table that either there must be an error in the diagnosis, or sarcomata in this region are not so malignant as they are in other parts of the body. As regards the technique of the operation, the incision should be made on the tips of the spinous processes, and should be large enough to expose at least three vertebræ ; he does not believe in osteoplastic resection.

L. Pick²⁰ records a case of primary melanotic tumour of the spinal cord ; he also records several other cases of intraspinal tumour.

Oppenheim and Borchardt²¹ give notes of two cases of intraspinal tumours successfully operated on. One, in a woman, was a fibroma or fibro-sarcoma, intradural in situation, in the sixth or seventh cervical vertebra. The other was in the mid-dorsal region in a man forty-nine years old.

Suture of the Spinal Cord.—Ryerson Fowler²², of New York, reports a case of revolver wound of the spinal cord between the tenth and eleventh dorsal spines, in which ten days had elapsed before operation was undertaken. The cord was found completely severed, the bullet lying between the severed ends. The ends of the cord were sutured with three fine chromicized catgut sutures. He recovered from the operation, and was living more than two years after, but, except as regards diminution of the anæsthesia, there was little improvement in his condition. The result is not so good as in the Stewart-Harte case, which was operated on three hours after the injury.

Fracture of the Spine.—H. L. Burrell²³, of Boston, presents a summary of all the cases (244 in number) of fractured spine which were treated at the Boston City Hospital from 1864 to 1905. Statistics may be very deceptive, and Dr. Crandon and the author arrived at different conclusions from a perusal of the same figures. The author concludes his paper as follows :—

1. Fractures of the spine may well be divided into two classes, viz., fractures with and without injury to the cord.

2. It is best not to decide from the statistics what the treatment of an individual case of fracture of the spine should be, because the lesion varies so widely.

3. In many cases of fracture of the spine it is impossible primarily to state whether the cord is crushed or pressed upon by bone, blood, or exudate, except by an open operation.

4. Only by persistence of total loss of reflexes, complete insensibility to touch and pain, and motor paralysis below the level of the lesion, can total transverse destruction of the cord be diagnosed.

5. If pressure on the cord be allowed to remain for many hours, irreparable damage to the cord may take place.

6. Unless it is perfectly clear that the cord is irremediably damaged, an open operation to establish the condition of the cord, and to relieve

pressure, is imperative as soon as surgical shock has been recovered from.

7. In certain cases of fracture of the spine, when the cord is not injured but is liable to injury from displacement of the fragments of a vertebra, rectification of the deformity and fixation of the spine may be used.

8. If the cord is crushed, no matter what treatment is adopted, there will of necessity be a high rate of mortality.

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SPIROCHÆTOSIS.

J. W. W. Stephens, M.D.

R. Blanchard¹ places the genera *spirochæta* and *treponema* in the family trypanozomidæ, and defines *spirochæta* as follows: Body excessively slender, spiral, flattened, ectoplasm taking the form of a narrow undulating membrane surrounding spirally the whole body. No flagella (?—J. W. W. S.). No endogenous spores. Nucleus very elongated, filiform, occupying the axis of the body with chromatin granules on its surface. Multiplication by long division. Among these we have the following species: *S. obermeieri*; *S. duttoni*; *S. anserina*, causing a fatal disease among ducks and geese in Caucasus and Tunis; *S. theileri*, in cattle in Transvaal; *S. pyogenes*, in cases of tuberculous pyelitis, purulent pericarditis, and diarrhœa, in the latter case in the muscular layers of the gut; *S. gallinarum*, causing a septicæmic disease in Brazil in poultry; *S. tenuis obtusa* and *S. tenuis acuminata* (vide YAWS); *S. vincenti*, in Vincent's angina; *S. laverani*, in blood of mice; *S. vespertilionis* in a Tunisian bat (V. Kuhli); *S. ovina*, in the blood of sheep in Erythrea; *S. danteci* in cases of dysentery, in enormous numbers; *S. bizzozzeri* in stomach of dogs, cats, rats. The genus *treponema* (Schaudinn) is defined as follows: Spiral body, not flattened. Section cylindrical. Flagellum at each end. No undulating membrane. To this genus belong the *T. pallidum* of syphilis and *T. pertenuis* of yaws.

J. W. W. Stephens², by special methods, shows that *S. duttoni* has a terminal flagellum, and that by the mode of treatment (physical and chemical action) the spirochæte can be separated into two parts, a central "core" deeply staining and a lightly staining "sheath."

A. Castellani³, examining two cases of hæmorrhagic bronchitis in Ceylon, found numerous spirochætes in the sputum.

Zettnow⁴ confirms Borrel's statement as to *S. gallinarum* being provided with numerous flagella (peritrichous), and also states that he has observed the same in *S. obermeieri* (?)

Tick Fever.—Ross describes the disease as seen by him in Uganda. Incubation period, two to eight days. In the European the onset is characterized by fever, headache, vomiting. These symptoms last twenty-four to forty-eight hours, the temperature falls, and there is an intermission of four to five days. In the European there are usually from four to six relapses. Parasites are scanty. The author recommends the injection of a drop or two of the patient's blood diluted with a little 1 per cent citrate solution, into a monkey where parasites have not been found.

Post mortem there are small infarcts in the lungs, and petechiæ in the endocardium.

F. G. Novy, and R. E. Knapp⁵ with a spirochæte believed to be *S. obermeieri*, have obtained the following results. By repeated injections of spirochætes into rats, a serum has been got with *preventive* and *curative* action. In 7 out of 10 cases rats were infected with a solution of spirochæte blood that had been filtered through a Berkefeld filter under a pressure of 50 lbs. They consider that as spirochætes divide transversely, have no definite structure, and are not markedly plasmolyzed by water, they are bacteria and not protozoa.

Koch⁶ notes with regard to the habits of *Ornithodoros moubata*, which transmits the spirochæte (*S. duttoni*) of African tick fever, that it is exclusively a human tick. It is nocturnal in its habits, and after sucking blood, quickly hides again in the earth of the native huts or rest-houses. It likes dry soil, and in fact, if the earth is moist (as is the case when goats are brought inside the hut at night), no ticks are to be found. The African tick fever differs clinically from the European relapsing fever (*S. obermeieri*) in the following points. In the European form the first attack lasts six to seven days; then follows an apyrexia of five to six days, then a second somewhat shorter attack and a longer apyrexia, and so on. In the African form, the maximum duration of the attack is three days and the apyrexia six to ten days. Again, in the African form the number of parasites may be extremely scanty, and thus difficult to find. It is advisable always to make a smear as large as a sixpence, dry thoroughly, de hæmoglobinize with water (without fixing), and then stain with gentian violet, five to ten minutes.

Koch has found spirochætes in about a quarter of the eggs up to the twentieth day of development of ticks which had sucked spirochæte blood. They can then be seen no longer, but must exist, as young ticks carry the infection. It is probable indeed, that ticks in the young stage are by far the most infective (though adults also may convey the disease). Koch found infected ticks to occur in practically every hut examined, in a variable proportion, e.g., 7 to 50 per cent. In the huts, however, there are frequently no natives suffering from spirochæte fever. The question therefore arises, how do these ticks get their infection? Various *hypotheses* are possible, of which only one may be

mentioned here, viz., that rats contain spirochætes, and that they may act somewhat as rats do in regard to plague. The natives in tick districts have a considerable immunity, probably through attacks in youth, as monkeys that have had a severe attack are quite immune against a new infection. Infection can generally be easily avoided by not sleeping in native huts or rest-houses, the favourite haunts of the ticks.

A. Breinl and A. Kinghorn⁷ have succeeded in inoculating the following animals with *S. duttoni* of African tick fever from monkeys: (1) Rats (intraperitoneally), incubation period 12 to 16 hours; death in 1 to 7 days. Rat to rat, incubation period 2 to 6 hours. Duration of disease, 1 to 45 days. Relapses also occur. (2) Mice. Infection on day after inoculation, followed by death, on the same day or day after this. (3) Guinea-pigs (intraperitoneally). Spirochætes found, but the animals survived. (4) Rabbits (intraperitoneally). Spirochætes found after 2 to 3 hours. Death on the third to the tenth day. (5) Dog (intraperitoneally). Spirochætes found after two hours. Disappeared on fourth day. A pony and monkey were also infected. The pathological changes are similar in most of the animals, viz., the spleen is enlarged, with hæmorrhagic or small anæmic infarcts. The liver also is enlarged, with hæmorrhage into the capsule tissue substances, and shows small necrotic foci. The medulla of bone is soft and pale grey. The serous membranes show numerous petechiæ.

Hödlmoser⁸, as the result of a large experience of relapsing fever in Bosnia and Herzegovina, states that herpes labialis is a common symptom. Of 17 cases with icterus, 11 died. The spleen is characteristically enlarged and tough. Pneumonia is not an uncommon complication. **Pyramidon** reduces the temperature, but has no influence on the spirochætes.

A. Breinl⁹ finds that the spirochæte of African tick fever (*S. duttoni*) is a different species from a New York spirochæte identified by Novy as *S. obermeieri*, as each confers a relative active immunity against itself but not against the other.

The Ochindundu is the name given by the Angola Bantus to a bug described by F. C. Wellman¹⁰ which has the habit of getting its blood from ticks (*Ornithodoros moubata*). It is likewise said to produce severe effects on man.

E. E. Austen¹¹ identifies this bug as *Phonergates bicoloripes*, and gives the following description: Length, 18½ mm. Width of thorax at base of wings, 5½ mm. Colour, thorax metallic purple, hind legs bluish black, front and middle femora and front tibiæ coral red, with tips of femora and base and tip of front tibiæ black, middle tibiæ brownish. The tips of the front and middle tibiæ have on the under side a large spongy pad. The author thinks it extremely unlikely that the bug preys especially upon *O. moubata*.

REFERENCES.—¹*Arch. de Parasit.* May, 1906; ²*Lancet*, Aug. 1906; ³*Ibid.* Mar. 1906; ⁴*Zeits. f. Hyg.* 1906, p. 539; ⁵*Jour. Amer. Med. Assoc.* Jan. 1906, abst. *Jour. R.A.M.C.* 1906, p. 481; ⁶*Berl. klin. Woch.* Feb. 1906; ⁷*Lancet* Mar. 1906; ⁸*Würzburger Abhandlungen*, Bd. vi. Hft. 5; ⁹*Lancet*, July 16 1906; ¹⁰*Jour. Trop. Med.* April, 1906; ¹¹*Ibid.*

SPLEEN (Surgery of).*A. W. Mayo Robson, F.R.C.S.*

The surgery of the spleen is receiving much more attention than has heretofore been devoted to it by surgeons generally, if we may judge by the number of cases reported during the past year.

Subbottic, of Belgrade, has written of the axial rotation of enlarged spleen, and C. P. Childe¹ has reported a case of wandering spleen with intracapsular hæmorrhage, for which he successfully performed splenectomy. Another case of splenectomy for enlarged wandering spleen was also reported by R. H. Lucy².

When the spleen is freely movable and has a good pedicle, there may be a temptation to remove it in similar cases, as the operation is, of course, under the circumstances, not difficult, but it is certainly a question whether, when the spleen is movable but otherwise healthy, an attempt should not be made to save it by splenoplexy, an operation which has been performed successfully on a number of occasions, one of which was reported last year by Oppel.

Rupture of the Spleen.—Splenectomy for rupture of the spleen has been performed on several occasions during the past year. Graham S. Simpson³, in reporting a successful case in a young man of twenty-seven, and basing his observations on 100 cases which he has collected, suggests three points of importance in the diagnosis: An accurate history of the accident, signs of internal hæmorrhage, and localizing signs. Of these last, the most importance was attached to the fact that on changing the position of the patient the dullness of the right loin shifted, but not that of the left. He divided the cases into four groups: (1) Cases in which the patient died at once or within a few minutes of the accident (spontaneous rupture); (2) Cases in which the onset of symptoms was greatly delayed—from twenty-four hours to fifteen days. This delay might be due to clotting, or to the bleeding being at first subcapsular and subsequently bursting through the capsule. (3) In the majority of cases the symptoms showed themselves in from one to twenty-four hours. (4) In a few cases the symptoms of a rupture of the spleen had shown themselves, and had gradually passed off without operation. He recommended that all these cases should be operated on; those of the fourth group because, in two cases, the blood had later become infected. As regards the operation, he thought that splenectomy would usually be found necessary, as the ruptures were often very extensive, and frequently involved the vessels of the hilum.

Gunshot Injury during Labour.—In a case of gunshot injury of the spleen during labour, the wound being suicidally inflicted by a revolver, Professor Kronig⁴, of Freiburg, successfully removed the spleen and closed two openings in the stomach by sutures, the patient making a complete and perfect recovery.

Splenectomy for Myelogenous Leukæmia.—Maurice H. Richardson⁵ reports a case of splenectomy for myelogenous leukæmia. The patient recovered and the blood greatly improved, so that health was apparently restored for a time, but afterwards there was a relapse,

and death from locomotor ataxy. Richardson ends his report as follows :—

“ It seems to me a more reasonable assumption that the extirpation of the spleen had no effect upon the disease, one way or the other, early or late ; that the improvement noted was the result of medical treatment following the operation ; that the final break-up was the natural course of the disease.

“ Finally, I would say that if the early success of this case has encouraged others to extirpate a spleen in myelogenous leukæmia, it has done distinct harm. That the case may no longer be quoted as a case of successful operation in this disease, it has seemed important to publish the ultimate result. It is to be regretted that the patient could not be studied, and that no autopsy was made.

“ It is quite possible, of course, that my conclusions are unwarranted. A disease in which successful extirpations of the spleen are so unusual that the very success of the operation is to some minds the strongest evidence against the diagnosis—in which almost the only successful operation has been followed, after temporary improvement, by a distressing death—such a disease must by common sense be removed from the category of surgical affections, even if there is, as in this case, no positive proof that the final bad result is directly dependent upon the operation itself.”

In a paper by Kabbukoff⁶, giving an account of splenectomy for *hydatid disease*, in which the spleen has been removed successfully through a lumbar incision, he states that he has found recorded 278 cases of splenectomy, which had a total mortality of 37·4 per cent. In 79 of these cases the enlargement of the spleen was due to malaria, of which 23 died ; 94 were cases of so-called idiopathic hypertrophy, of which 38 died ; 29 were cases of hypertrophy associated with leukæmia, of which 26 were fatal. In 32 the operation was performed for floating spleen, of which only 2 died. There were 4 cases of operation for new growth, of which 1 died, and 9 for hydatid cyst, of which 2 died.

Non-Parasitic Cysts of the Spleen.—Charles A. Powers⁷ published a valuable paper on non-parasitic cysts of the spleen, in which, after stating that the subject was practically ignored by writers up to 1904, he describes a case of his own, in which, after posterior drainage, the patient died of sepsis on the twelfth day. A table is attached to the paper, in which reference is made to 32 cases, which he believes represents the known clinical material. Of the 10 cases treated by splenectomy, all recovered. He considers that the typical cyst of the spleen usually originates in a subcapsular hæmorrhage.

REFERENCES.—¹*Brit. Med. Jour.* Dec. 23, 1905 ; ²*Lancet*, July, 1906 ; ³*Ibid.* July 18, 1905 ; ⁴*Brit. Med. Jour.* July 28, 1906 ⁵*Ann. Surg.* Nov. 1905 ; ⁶*Arch. klin. Chir.* vol. lxxviii. part 1, in *Med. Chron.* Mar. 1906 ; ⁷*Ann. Surg.* Jan. 1906.

SPLENOMEGALY (Tropical). (*See LEISHMAN'S BODIES.*)

SPRUE.*J. W. W. Stephens, M.D.*

Van der Scheer¹ regards sprue as a sequela of appendicitis. In 7 out of 9 cases the distal portion of the appendix was found occluded. The author regards the fatty stool as the chief symptom of sprue. the aphthæ tropicæ and the diarrhœa as the consequences. The existence of sprue can be determined before the onset of characteristic symptoms by a microscopic or chemical examination of the fæces. The author attributes the symptoms to an intoxication in origin as above stated, and not to pathological changes in the pancreas.

J. Cantlie² advocates a combination of the "**Meat Treatment**" and "**Milk Treatment**" in cases of sprue. This is done by interposing the "fasting treatment." The patient on a meat diet should, every third or fourth day, fast from meat of every kind, and take milk, and milk only, for twenty-four hours. For rectal injections, in various affections of the lower gut, the author recommends warm **Sea Water** daily for three days, and afterwards every third day or once a week, until all mucus or fermentation is removed.

REFERENCES.—¹*Arch. f. Schiffs u. Trop. Hyg.* abst. Feb. 1906; ²*Jour. Trop. Med.* Sept. 1906.

STOMACH (Diseases of).*Robt. Hutchison, M.D.*

*Examination of Stomach Contents.*¹—Twenty years have passed since Ewald enriched medicine by introducing his "trial breakfast," and, in spite of many other methods of gauging the digestive capabilities of the stomach, some of which preceded Ewald and others succeeded his publication, none are capable of demonstrating it as well as this method. Boas finds that, in spite of the simplicity of the method and its practical usefulness, many practitioners have introduced various modifications which lead to error. The original details were as follows: The patient should receive into an empty stomach one roll of white bread, of about 35 grams weight, and 400 grams of water, or 400 grams of tea without milk or sugar, and after one hour the contents of the organ are regained by the tube and examined. In many publications considerable variations, both as to the quantity of the bread and fluid, and also as to the times after which the breakfast is to be regained, are given under the misnomer of Ewald's breakfast. First, he deals with the importance of an empty stomach. This means that the actual absence of all remains of food must be determined. In estimating the quantity of total acidity, it is obviously impossible to work if remainders of yesterday's meal are in the organ, since one has no idea of their chemical composition. Even for the measuring of free hydrochloric acid, emptiness of the stomach is important. It is therefore necessary to pass the stomach-tube before the breakfast to control this point. The importance of prescribing an exact quantity of the constituents of the meal, in estimating the quantity of acid, is clear without further explanation. The time during which the food is left in the stomach to digest is of utmost importance if one wishes to derive useful results. It is scarcely necessary to point out that the breakfast

must be given in the morning, and not during the course of the day, but some clinicians appear to be in the habit of even making this error. Turning to an error which is of considerable importance, he says that in certain individuals the secreted hydrochloric acid varies within wide limits, and at times a trial breakfast may bring to light a very high value. In order to avoid drawing conclusions from such a variation, Ewald has insisted that unless the result of the test leads to a typical conclusion, it is necessary to repeat it before making a diagnosis. In order to ascertain clearly the condition of the stomach, he finds it wise to test the evacuation not only for HCl and lactic acid, but also for the presence of peptic and rennet ferment. This estimation should be carried out quantitatively. But when the gastric contents include blood, bile, mucus, or saliva, the quantitative analysis for acid is not reliable. Only when positive results as far as HCl is concerned are obtained may deductions be made in this case. Lastly, he deals briefly with the question of the increase of the gastric juice in the cases of disturbances of the motor function of the organ.

Arneth² presents a table showing the results obtained in the examination of the blood and gastric juice in twenty-three cases of chlorosis treated in von Leube's clinic at Würzburg. From these figures he shows why it is that such discordant conclusions have been published in regard to the behaviour of the gastric secretion in this disease. The results of the analysis of the test meal appear to vary considerably in different stages of the malady, so that, according to the period of treatment at which Arneth's cases were examined, very different conclusions regarding the proportionate distribution of cases with very high, moderately high, or approximately normal values for the total acidity might be drawn. Arneth himself is of the opinion that in the milder and moderately severe cases of pure chlorosis there is usually a condition of hyperacidity, but that in general the acid values are in the neighbourhood of the normal limit. The presence of marked hyperacidity is the rule for cases of great severity, but sub-acid values never occur. The treatment employed in these cases did not differ in any essential feature from that usually resorted to. The iron given was administered in the form of a pill composed of 7.5 grams of reduced iron made into 90 pills with equal parts of glycerin and gelatin. One or two of these pills are given three times a day, after meals.

*X-Ray Examination of the Stomach*³.—The digestive power of the stomach, an exact estimate of which is essential in the treatment of disorders of metabolism and diseases of the intestines, has hitherto been measured only by means of Ewald's test breakfast, with the subsequent use of the stomach pump, or by the iodine or salol reaction of the urine, as suggested by Sahli. Schwarz has recently proposed a very simple method of examining the digestive power of the gastric juice, at least as far as the digestion of connective tissue is concerned. He uses subnitrate of bismuth, a substance which is well known to cast a deep black shadow when the X rays are directed upon it. He makes

the patient swallow a large pill of about one-third or half an ounce of the powdered subnitrate enclosed in an envelope of connective tissue obtained from the appendix vermiformis of an animal such as the sheep, goat, or ox. If the abdomen of the patient is exposed to the X rays a short time after swallowing the pill, a deep black spot of about the size of a farthing is seen at the bottom of the stomach, on its lowest point mostly. As soon as the coating of connective tissue is digested, the powder is scattered, and the contents of the stomach are well mixed with the powder, after which a fainter but extensive shadow, which gives the contour of the entire organ, is cast on the photographic plate or on the fluorescent screen. This is the case in seven hours after ingestion of the pill in healthy stomachs. If the digestion is affected, as is the case in gastropnoia, deficiency of acid, pyloric disease, and cancer, the black spot remains visible for a longer time—such as 9, 11, or even 20 hours. If the contents of the stomach are digested too quickly, as in hyperacidity, the black spot disappears in from two to five hours. The method is very simple, and causes no serious inconvenience to the patient.

Rieder speaks very highly of the advantages to be derived by the use of the X rays in determining the position and conformation of the stomach and other portions of the alimentary tract, and states that valuable information in regard to their functional efficiency may also be obtained in this way. The simplest method of procedure is to have the patient drink about fifty cc. of water to which ten or fifteen grains of subnitrate of bismuth have been added. The patient swallows the mixture under observation by means of the fluoroscope, and useful information in regard to the œsophagus and stomach is often secured. The act of swallowing may be studied more at leisure if a small quantity of the bismuth salt is given in a capsule or as a species of dough by mixture with a small amount of water. If more exact observations on gastric motility, or intestinal activity, etc., are desired, a bismuth meal may be employed. To prepare this, about thirty grams of subnitrate of bismuth are mixed with a little milk, and this is then added to 300 to 400 grams of flour gruel, sweetened with a milk sugar in order to obviate the tendency to constipation. In order to study the conditions existing in the large intestine, rectal injections containing bismuth may be administered, and the author has found that by the use of one litre of fluid it is possible to insure penetration as far as the ilioœcal valve. The author also points out the various ways in which this method of examination may be utilized for diagnostic purposes in cases of gastric affections, such as hour-glass stomach, gastropnoia, dilatation of the stomach, intestinal stenoses or obstruction, dilatation or descent of the colon, the differential diagnosis of tumours, etc. Although ordinarily the observations are most satisfactorily made by means of direct inspection with the fluoroscope, instructive radiographs may also be secured as in any other department of X-ray work.

Holzknœcht⁴ describes observations on healthy and diseased stomachs by means of X-ray examinations made after the ingestion of food

containing considerable quantities of subnitrate of bismuth. One conclusion reached was that a stomach normal in size and position is very rarely seen. The normal type of stomach is rather small, and is so placed that the pylorus forms its lowest point. The form most often observed, on the other hand, is much larger, and through descent of the greater curvature exhibits a rise at the pylorus. The author explains the formation of this type of stomach by the almost universal relaxation and atrophy of the anterior abdominal muscles, induced by the habits of muscular inactivity of the present age. In this way the lower part of the abdomen becomes protuberant, and the pad of intestines on which the stomach normally rests drops down a considerable distance. The extremities of the stomach being fixed, while it is to a certain extent deprived of its natural support, the organ, which was not constituted for the purpose of standing a strain of this sort, undergoes gradual dilatation in the direction of its long axis. In other words, this is the beginning of gastropptosis, a condition which usually receives attention only when present to a marked degree, whereas naturally all intermediate stages must also exist. The author describes the phenomena attending the filling of the stomach with food as visible on the fluoroscopic screen, and explains the manner in which observations of this sort may be used for the detection of nonpalpable carcinomata. Owing to the infiltration of the gastric wall with the tumour masses, easily recognizable abnormalities in the behaviour of the stomach when bismuth food is poured into it can readily be detected. Its functional efficiency can also be tested by enclosing bismuth in tiny bags of gold-beater's skin, which are swallowed by the patient. As soon as the bag is digested by the gastric secretions, the bismuth escapes, an act which is readily discernible with the fluoroscope. The author considers that this method is superior to the somewhat similar one of Sahli.

Hyperchlorhydria.—This, according to Surmont⁵, is often associated with other gastro-intestinal and nervous disorders, so that it is often impossible to say whether it is primary or secondary to the concomitant conditions. He is able to differentiate several clinical varieties. First, there is the hyperchlorhydric crisis, characterized by abdominal pain some time after meals, with or without pyrosis and vomiting; sometimes there is diarrhoea instead of vomiting. Secondly, there is a latent form, in which the paroxysms are very infrequent or entirely absent, the condition being, so to speak, accidentally revealed by an examination of the gastric contents. It is to be noted that hyperchlorhydria may be continuous or periodic. Thirdly, hypersecretion will sooner or later be established along with the excess of hydrochloric acid. Finally, there is the syndrome of Reichmann (hyperchlorhydria with hypersecretion and stasis of gastric contents), which often indicates obstruction of the pylorus.

TREATMENT.—The treatment is minutely described, especially the diet; spices, condiments, fatty foods, alcohol, game, most fruits and vegetables are forbidden, and meat extracts are not recommended.

The **best Diet** is an albuminous one, consisting of milk, custard, lean meat (beef, mutton, and horse being especially mentioned), chicken, toasted bread, and plain water; vegetables are best taken as soups. Meals should at first be frequent and small, the number being gradually reduced; a good rest is advisable after each. For those of excitable temperament, warm hydrotherapy is recommended, while hot compresses are valuable for the relief of abdominal pain. With regard to drugs, bitters before and acids after meals should not be given, the indiscriminate use of bicarbonate of soda is harmful, and belladonna has proved disappointing. **Calcium Carbonate** after meals is recommended, with magnesia if there be constipation. The depression so often met with in this condition may be combated by phosphate lemonade. Permanent hypersecretion indicates the use of some **Table-water**—Brides, Carlsbad, and Vichy being the best. Where there is gastric stasis, **Gastro-enterostomy** should be thought of; solid food is to be stopped, and **Bismuth** may be of value, taken in the form of a milk, first thing in the morning.

Musser⁶ recommends the use of **Nux Vomica** in hyperchlorhydria, beginning with a dose of 15 drops three times a day, and increasing it by 5 drops every three days up to the limits of tolerance. He believes that the benefit so obtained is to be explained by the fact that most cases of hyperchlorhydria are due to a neurosis, and really require tonic rather than sedative measures.

Stagnation of Stomach Contents.—In an address on this subject⁷ McPhedran points out that the time normally required for the chymification of an ordinary dinner, and its escape into the duodenum, is six hours, or seven as an outside limit. All retention of food beyond this time indicates that either or both of two conditions exist: (1) Deficiency in the expelling power of the stomach; (2) Abnormal difficulty in the passage of the food through the pylorus.

1. Deficiency in the muscular power of the stomach may be actual, or relative, or both. Actual weakness or atony is very common, and results from the action of any debilitating influence. The commonest cause of relative deficiency is overloading of the stomach by unsuitable or ill-chewed food.

2. Pyloric obstruction may be due: (a) To *spasm*—the result of hyperacidity or the irritation of an ulcer; (b) To benign stenosis from a cicatrix; (c) To malignant disease; (d) To pressure from without, e.g., from adhesions.

The length of time beyond the normal that the food remains in the stomach is a fair gauge of the degree of gastric insufficiency, or rather of food stagnation, as the two terms are not necessarily synonymous. To determine the degree of stagnation, it is necessary to remove the stomach contents by means of the stomach-tube at varying times after food is taken. If the contents found seven hours after dinner are only small in quantity, the degree of stasis is slight; still there is some, and material disturbance of digestion would follow the introduction of fresh food before the complete discharge of the contents. In severer

cases some food remains may be found in the morning ; this indicates a decided degree of stasis. By giving an Ewald trial breakfast of toast and weak tea, and syphoning the contents in an hour, a very fair estimate can be formed of the motor power of the stomach, and at the same time the opportunity is afforded of determining the condition of the gastric secretion. With healthy gastric motility, not more than 1 oz. of this breakfast should be found in the stomach an hour after it is taken. By forcing some air into the stomach with a rubber bulb before withdrawing the tube, the position and outline of the stomach can usually be definitely determined. In most cases of prolonged retention of food the stomach is somewhat prolapsed ; the converse is also true—namely, that in most cases of material prolapse of the stomach there is also some degree of retention of food.

TREATMENT.—In the treatment of the large class of cases in which stasis is due to atony of the stomach, our first care should be to search for and remove the cause of the atony. It is often a part of general debility, but in many cases the evidences of general weakness may be very slight. The general condition should receive suitable treatment. All habits and conditions detrimental to health should be corrected—such as insufficient rest and sleep, indulgence in alcohol, insanitary surroundings, unsuitable food, over-eating, excessive drinking (especially of iced liquids with food), and insufficient time between meals. Of all injurious habits, imperfect mastication is the most prevalent, and probably the most effective, in causing gastric stasis. Besides furnishing the stomach with masses that often cause traumatic injury to its walls and overtax its motor powers, the rapid eating attending this habit invariably leads to over-eating. Physicians whose work leads them to examine the stomach contents of many persons must be struck by the great frequency of insufficient mastication. The unbroken masses of food increase enormously the labour of the stomach ; if it is weak from any cause it is certain to be unequal to the task thrust upon it, and stasis of food must occur sooner or later. If the stasis recurs from day to day, in time it will be continuous, and dilatation must be the ultimate consequence.

How minute should the food be made before being swallowed ? That depends very much on the individual. The robust labouring man does not require food that is as finely divided or as easily digested as the office man with feeble digestive powers, or the neurotic woman “ who enjoys her ill health.” For both these latter all food should be reduced to fine gruel-like particles in the mouth before being swallowed. This is the best antidote to the taking of food improper in quantity and quality.

It will not be necessary to speak of the necessity of fresh air, recreation, and a proper holiday, with the tonic effects of change of scene.

Baths, hot and cold douches, cold compresses to the epigastrium at night, and massage, do good. **Regular Exercises**, more particularly of the abdominal muscles, are of much service, especially in women, as their dress interferes greatly with the proper action of these muscles,

which are further injured in child-bearing. Systematic exercises taken morning and night are of great service in strengthening these muscles. It is irksome treatment, but the benefit from it will amply repay the time and trouble required.

Drugs are of little use in relieving gastric stasis. As there is excessive secretion of hydrochloric acid in the great majority of cases, the bitter tonics and stimulants, so much used, tend to increase the acid secretion, and may therefore aggravate the condition.

The drugs of chief use are probably those of a sedative and antiseptic character. As there is usually some general nervousness as well as gastric hyperæsthesia, short courses of **Bromides** often do good. The strontium salt is the best. The natural **Salicylate of Sodium** is a useful antiseptic, as it inhibits especially the growth of yeast cells. It also increases the flow of bile by rendering it more liquid.

The cases due to pyloric obstruction fall into two classes : those due to spasm of the pylorus, and those due to organic stenosis. Peptic ulcer, in or near the pylorus, in the early stage causes obstruction by exciting spasm ; later there may be cicatricial thickening and contraction. These cases are often extremely rebellious, and the tendency of late has been to refer them for operation at once. But although the results of gastro-enterostomy are usually very satisfactory, it does not restore the stomach to a state as good as normal. Therefore it should not be resorted to until judicious patient treatment has failed to give relief. We should make an effort to lessen the acidity by giving a liquid or very soft diet free from particles and irritants, and the use of antacids for the relief of pain and the lessening of excessive acidity. Regular **Lavage** should be done for a time if there is material retention, and, after emptying the stomach, some sedative, as **Bismuth Subcarbonate** in full doses, may prove useful. Large doses of pure **Olive Oil** are often of benefit in soothing the stomach ; they have the effect, also, of lessening the secretion of acid (Pawlow). If necessary, rectal feeding may be depended on for a short time, and then a gradual return made, first to a liquid diet, and later to solid food. If these means fail, there remains only a resort to surgical aid.

Acute Dilatation.—Herrick⁸ reports two cases of this condition, the first occurring in the course of a pneumonia, the second in a patient who had been operated upon for gall-stones. One patient recovered under lavage ; the other died.

Acute gastric dilatation is characterized by sudden severe pain, profuse vomiting, which may be brown or black, and is often offensive. It is regurgitated rather than vomited, coming up in gulps. The urine is scanty, the bowels loose or constipated, the temperature may be subnormal, the pulse rapid. The abdomen is distended, especially the lower half. Fluctuation and succussion sounds are clearly made out. The stomach-tube draws large amounts of brownish or greenish thin fluid, which may contain bile, pancreatic juice, and altered blood. The odour, though offensive, is not fæculent. There may be large quantities of gas withdrawn or belched. The succussion sound is

especially valuable in diagnosis, which may be corroborated by the stomach-tube, which withdraws characteristic fluid and shows enormous dilatation. The rational treatment consists in **Lavage** and that adapted to encourage elimination. The prognosis is extremely grave, death resulting as a rule within a week.

Mayo asserts⁹ that *Chronic Ulcer of the Stomach* is a more frequent disease than is commonly supposed. He compares the autopsy findings with the clinical diagnosis in the same hospitals, which show a much larger percentage of the former. In regard to the relative frequency of gastric and duodenal ulcers, we have but few statistics, and these show too small a proportion of duodenal ulcers. In the last two and a half years, out of 231 patients operated upon by himself and Charles H. Mayo, the duodenum was involved 74 times. For clinical purposes, the author classifies all ulcers operated upon in two groups: the indurated and the non-indurated. The indurated ulcer involves all the coats of the organ, and usually shows evidences of cicatrization in some parts of its extent. The diseased area is a thick, milky-white patch, easily identified from without the gastric or duodenal wall. In the stomach, it involves the pyloric portion in the great majority of cases, frequently saddle-shaped, riding the lesser curvature, and extending flap-like down the anterior and posterior walls. The non-indurated ulcer has also been called the medical or clinical ulcer, because, although they give undoubted evidence of the disease, there is nothing to show the site of the ulcer from the exterior of the stomach upon operation. The reason for this is that the lesion involves only the mucous coat. It may be so small as to escape detection even with a careful examination of the interior of the stomach. An interesting diagnostic feature is the presence of an enlarged sentinel gland in the omentum, tributary to the lesion.

TREATMENT.—In these cases, operating for purely medical indications leads to unscientific and at times indiscriminate resort to surgery. Mayo does not advise operation in any case of acute ulcer unless compelled by some complication, such as perforation, hæmorrhage, or grave obstruction. He does not advise operation in chronic ulcer until careful and prolonged medical treatment has failed to cure permanently, nor in neurotic patients with prolapse of the stomach. He thinks operation to be indicated in all cases of stagnation and retention of food depending on mechanical causes such as pyloric obstruction, and in cases of exhausting hæmorrhage; also in that considerable group of chronic cases with acute exacerbations, in which frequent relapses, with their attendant disabilities, prevent the patient from the enjoyment of good health. The operation favoured by the author is gastrojejunostomy, made on a line perpendicular with the cardiac orifice of the stomach: the opening must be placed on the posterior wall at the very bottom of the gastric cavity, and should extend anteriorly $\frac{1}{4}$ inch; the jejunum should be anastomosed within 3 inches of its origin, so that there shall be no loop. Next to this, the operation of greatest value is gastro-

duodenostomy as devised by Finney. The operation of Rodman will gain ground in the future.

DIAGNOSIS.—Dawson¹⁰, in discussing this question, distinguishes between the round, punched-out ulcer without any thickening of its edges (the so-called acute, perforating ulcer), and the chronic ulcer with thickened shelving walls and adjacent induration. He protests against the common view that pain after food, vomiting, and localized tenderness, especially in an anæmic young woman, indicate ulcer, and that if hæmatemesis is superadded the diagnosis of ulcer is certain. He is of opinion that conditions other than ulcer, such as “anæmic dyspepsia,” septic gastritis, hyperchlorhydria, and neurasthenic dyspepsia may all produce the same symptoms. He discusses the differential diagnosis as follows :—

Anæmic Dyspepsia.—In studying the statistics of gastric ulcer, there is a marked discrepancy between the pathological and clinical records. Thus in all clinical records women outstrip men, though this preponderance varies much in different statistics—for example, 5 to 1 (Martin), 3 to 2 (Fenwick), and of the female cases 75 per cent are said to occur under thirty years of age. Yet, with pathological records, subjects under thirty years of age only account for 28 to 40 per cent of the deaths, and there is no such preponderance among the females. This discrepancy between the pathological and the clinical records with regard to the age-incidence of gastric ulcer requires explanation. Some seek it by pointing out that a large majority of the mild cases occur in the young. But we have no ground for thinking that proved cases of gastric ulcer have a tendency to run a mild course in the young. To begin with, the chronic variety is fairly common in the young. Thus, out of 24 patients under thirty at the London Hospital, in which ulcer was found at the operation, in 6 it was of the chronic variety. And the acute perforating ulcer, which is specially prone to occur in youth, by its very character suggests so acute and destructive a process that it is difficult to conceive of a mild form of it. It either must heal quickly, go on rapidly towards perforation, or erode a vessel before doing so. It is a morbid condition from which one would expect a high mortality. Yet in a large number of female cases the clinical manifestations have endured weeks, months, and even longer. Such cases cannot be due to acute ulcer, and one is forced to the conclusion that they are erroneously classed as such. Again, note the rapid way in which this group of cases responds to treatment. Put them in bed, open their bowels, and after two or three days give them solid digestible food, and iron, and they rapidly get better. The symptoms of gastric ulcer disappear far more slowly, and solid food and iron are only tolerated after a lapse of time, when the patient is convalescent.

If hæmatemesis is added to the foregoing symptoms, the evidence for ulcer is stronger, though not even then conclusive. Blood from the stomach does not necessarily have a focal source, but often has multiple points of origin, even when it is profuse. This is the case in certain

blood diseases—anæmia amongst them—and such conditions as post-operative hæmatemesis, septic gastritis, and hæmorrhagic gastralgia.

Again, cases with the symptom-complex of pain, tenderness, vomiting, hæmatemesis, have been operated upon, and yet a most careful search of the inside of the stomach has failed to disclose an ulcer. In 5 out of 24 cases under 25 years of age operated on for gastric ulcer, a careful search failed to disclose the ulcer. In all the 5 cases there had been repeated attacks of hæmatemesis. Since only the cases with severe symptoms indicating hæmatemesis are operated on, and 5 out of 24 showed no ulcer, one may justifiably draw the conclusion that an even larger proportion of the cases with mild symptoms are not due to ulcer. Similar cases have died, and no focal lesion has been found at the autopsy. Such cases may be spoken of under the title "hæmorrhagic gastralgia."

But though these milder anæmic cases are not ulcer, they have a greater proneness to invasion by acute ulcer, which is a complication of their dyspepsia as duodenal ulcer is of a burn. By removing these anæmic cases from the category of gastric ulcer, the seriousness of the latter is brought out in fuller light, the proportion of deaths, perforations, and other serious complications to the total number of cases becomes higher, and the importance of radical treatment emphasized, for it is the inclusion of the milder anæmic cases which accounts for the uniformly favourable results obtained by some physicians from the simple "rest and milk" treatment.

Septic Gastritis.—Another and important cause of the above cardinal symptoms is a gastritis following oral or pharyngeal sepsis, as was first pointed out by Hunter. On examining the mouth and throat, the gums will be retracted, the edges red, swollen, and shiny; the teeth are often loose, and round their exposed necks are foul débris and tartar; or there is pus discharging from dead stumps; or, again, muco-pus is continuously running down from the nasopharynx.

When one recalls how virulently septic the pus from teeth may be, that severe gastric symptoms result is not surprising, especially if the hydrochloric acid in the stomach happens to be diminished. The wonder is that the consequences are not more frequent and serious.

Extract the stumps, clean and treat the mouth, nose, or pharynx, as the case may be, and the symptoms rapidly abate—too rapidly for gastric ulcer to be the cause. At the same time, the view that oropharyngeal sepsis may predispose to the promotion of gastric ulcer seems a very probable one.

In distinguishing between true gastric ulcer and the above conditions which may simulate it, the following points deserve attention:—

Gastric Ulcer and Anæmic Dyspepsia.—The more acute the symptoms and the shorter the time since their onset, the more likely is the case to be ulcer. The fact that a young girl has been continuously ill for some months is, as far as the presence of ulcer is concerned, somewhat reassuring; and complete cessation of symptoms between acute attacks, which have not been systematically treated, is rather suggestive of ulcer.

If the symptoms are not subsiding after a few days in bed, or if there is any recurrence, especially of hæmatemesis during or at the end of such treatment in bed, ulcer is probably present. If a case that has presented the features of pain, tenderness, vomiting, bleeding, suddenly relapses with hæmatemesis only (pain and tenderness being absent), the probability of an ulcer is increased. A large amount of blood is more likely to be caused by ulcer, especially if it recurs in large quantities, though there is no certainty about this, as the cases of hæmorrhagic gastralgia quoted above show.

Pain.—In most ulcers this, if present, is made worse by food, though with those of the pylorus it will be occasionally relieved by it. Neither the length of time that pain occurs after food, nor the influence of posture upon it, is of much value in determining the position of the ulcer. In anæmic dyspepsia and septic gastritis, the sequence between food and pain is rather less close than in ulcer, whereas in hyperchlorhydria and neurasthenic dyspepsia, food more often relieves pain than promotes it.

Deep Localized Tenderness.—This, if constant in position, and not larger than a shilling, is suggestive of ulcer. But most often it covers a wider area, and is then equally characteristic of other non-malignant gastric affections. Frequently rigidity of the rectus makes accurate localization difficult. The long continuation of a strictly localized tenderness, after the other symptoms have disappeared, is in favour of ulcer.

The explanation of localized tenderness is uncertain. It cannot be caused by pressure on the ulcer, for it is often associated with ulcer on the posterior wall and with cases where ulceration is absent. In two cases under the writer, the points of tenderness at the subsequent operation were over the liver. The tenderness is perhaps due to the parietal peritoneum, though adhesions are generally absent from the parts immediately beneath the spot.

Superficial (Skin) Tenderness.—This is found in the epigastrium, and less frequently on the back outside the lower thoracic vertebræ, or it may form a complete band from front to back. Skin tenderness is not always present in ulcer, nor when present is it distinctive of ulcer. Thus, of 20 cases operated on at the London Hospital for gastric ulcer in which skin tenderness was present, in 4 there was no ulcer.

That skin tenderness occurs in gastric conditions other than ulcer—for example, anæmic and neurasthenic dyspepsias—is undoubted, but I think in the latter it disappears more quickly after a short rest in bed, whereas in ulcer it will become more contracted in area and then persist a while. The degree of pressure within the stomach is sometimes a factor in the production of superficial tenderness. The latter will be more marked with a distended viscus, especially if the motor power of the wall is good and the emptying of the stomach is impeded at the pylorus.

The situation of superficial tenderness is not a guide to the exact position of a stomach lesion.

DIETETIC TREATMENT OF ULCER.—Senator¹¹ first mentions the plan of treatment for gastric ulcer employed by Lenhartz, who advocates giving the patients small quantities of very concentrated food, such as eggs, from the first, and rapidly increases the diet by the addition of sugar and milk, and gives scraped beef as early as the end of the first week. The idea of this treatment is to maintain the patient's bodily strength and prevent the doubly weakening effect of hæmorrhage and starvation. Senator occupies a middle position between the views of Lenhartz and the older plan of starvation treatment, and recommends a dietary which will be nourishing but also non-irritating, easily digestible, concentrated, and tending to check hæmorrhage. This consists in the use of gelatin, fat, and sugar. The first step is the administration of 10 per cent sweetened gelatin solution, which is given in tablespoonful doses at intervals of from a quarter of an hour to two hours. Small amounts of fresh butter and cream are also allowed, the butter being preferably given in little frozen balls, and the cream beaten up with sugar so as to form the ordinary whipped cream. The daily allowance of this dietary is equivalent to 900 or 1,000 calories, and it may be begun even immediately after a hæmorrhage. The gelatin solution may, after a time, advantageously be replaced by more palatable forms of the same material, such as calf's foot jelly, or other varieties. Other therapeutic measures are also employed, and in some instances rectal feeding may be resorted to, though of late years the author has found little occasion to use it.

TREATMENT OF HÆMATEMESIS.—Ewald¹² has found no benefit from the use of **Adrenalin**, either by the mouth or hypodermically. Gelatin and lime salts have proved equally uncertain. On the other hand he strongly recommends washing out the stomach with **Iced Water**. In carrying this out, a small injection of morphia should be given and the throat anæsthetized with cocaine. The tube should just enter the stomach. Washing is continued till all blood has been removed. The bowel should also be washed out to remove any blood which may have entered it. If collapse appears, hypodermics of **Ether** and **Camphor** should be given, and **Enemata** of peptone or egg with brandy; **Hot Applications** should be made to the extremities. **Hypodermoclysis** of normal saline into the subclavicular regions should be performed if death threatens. It is extremely difficult to say when **Operation** should be performed for hæmatemesis. The statistics of such operations are untrustworthy, as unsuccessful cases are not published. If washing out fails, operation is not likely to succeed.

REFERENCES.—¹*Berl. klin. Woch.* No. 44a, 1905 (abst. in *Brit. Med. Jour.* epit. Jan. 8, 1906); ²*Deut. med. Woch.* April 26, 1906; ³*Lancet*, Feb. 17, 1906, and *Münch. med. Woch.* Jan. 16, 1906; ⁴*Berl. klin. Woch.* Jan. 29, 1906; ⁵*L'Echo Méd. du Nord*, abst. in *Brit. Med. Jour.* epit. Dec. 9, 1905; ⁶*Ther. Gaz.* Nov. 15, 1905; ⁷*Brit. Med. Jour.* Feb. 17, 1906; ⁸*Jour. Amer. Med. Assoc.* Mar. 31, 1906; ⁹*Jour. Amer. Med. Assoc.* Oct. 21, 1905; ¹⁰*Brit. Med. Jour.* Oct. 21, 1905; ¹¹*Deut. med. Woch.* Jan. 18, 1906; ¹²*Berl. klin. Woch.* Nos. 10 and 11, 1906.

STOMACH (Surgery of).*A. W. Mayo Robson, F.R.C.S.*

Chemical Examinations.—Professor¹ Eichhorst is enthusiastic about the necessity for a thorough chemical examination of the stomach contents as a means of diagnosis, and has spared no pains to give a useful and at the same time a critical account of the various methods of investigation upon which his wide experience has shown reliance may be placed. It is well known that the modern methods of chemical investigation have long shown themselves to be as little free from contradictions as many another older form of enquiry, but so useful are they in many cases, that no modern physician would hesitate to employ them in suitable cases. Professor Eichhorst shows what serious mistakes will follow too strong a faith in chemical investigations; for example, diminished motor power of the stomach is met with, not only in carcinoma of the stomach, but in pyloric obstruction, dilated stomach, gastric ulcer, and gastric catarrh; hyperchlorhydria is stated usually to be present in gastric ulcer, but Professor Eichhorst has shown that, in a series of gastric ulcer, hydrochloric acid was excessive in only 5 per cent, in 36 per cent of the cases it was present in normal amount, in 34 per cent it was reduced, and in 23 per cent it was absent.

Acute Post-Operative Dilatation.—Halstead², of Chicago, publishes a fatal case of acute gastric dilatation following nephropexy, and gives an instructive review of the pathology, symptoms, and treatment of this rare and very grave condition. In discussing the treatment, he points out that a sufficient number of cases have recovered to lead to the hope that an early diagnosis will in the future be made more frequently, and that with proper treatment the death-rate, which is now very high, will be lowered. Müller, who succeeded in saving life in two cases, lays great stress upon the posture of the patient, the pelvis being elevated, and the body so placed that the stomach can be readily emptied, retraction of the distended viscus being favoured by gravity. This surgeon also employed the stomach-tube frequently. In general, the plan of treatment may be briefly stated as consisting in stimulants, preferably the hypodermic injections of strychnine administered to the full physiological limit. Rectal alimentation, with complete rest of the stomach, secured by frequent use of the stomach-tube, should be employed. In the work *Diseases of the Stomach*, 3rd edition, by Mayo Robson and Moynihan, will be found a number of cases of acute dilatation treated successfully by gastric lavage.

Tetany.—W. A. Mackay and Ian Macdonald³ report an interesting case of severe gastric tetany treated successfully by gastro-enterostomy, and make the following remarks:—

“Theories as to the cause of this rare but terrible complication of the later stages of pyloric stenosis are fully discussed in monographs on diseases of the stomach, and recently in a paper by Jonnesco and Grosman⁴ in connection with a case successfully treated by gastro-enterostomy. A table drawn up by these authors shows that surgical treatment of the condition has been employed 11 times, with 8 recoveries and 3 deaths from post-operative complications; the

addition of our case raises the number to 12 operations with 9 cures. From the high mortality among cases treated otherwise than surgically, it becomes increasingly evident that such methods are almost invariably fraught with disaster. The perils of delay are impressed on one by the perusal of a carefully observed case recently reported⁵, where the patient, apparently in excellent condition for surgical intervention, gradually sank at the end of a week's careful treatment. As Mayo Robson has indicated, the final, appropriate and only rational treatment of gastric tetany should be surgical, to overcome the mechanical obstacle to the onward passage of the stomach contents."

Cardio-spasm.—J. F. Erdmann⁶ reports an interesting case of cardio-spasm occurring in a woman thirty-three years of age. The disease was associated with great and increasing difficulty in swallowing, with failure of ordinary means of treatment. The operation of gastrotomy with digital dilatation was completely successful.

Kraus has suggested the use of an elastic bag attached to a bougie, which, when passed through the stricture, is distended with air. The distended bag is then dragged forcibly through the stricture. Should this apparatus and other means of treatment fail, operation is indicated.

Pyloric Stenosis in Infants.—A. L. Fisk⁷, in an interesting paper, says that in true stenosis of the pylorus medical treatment has no place, and if in suspected cases, after ten days or two weeks of the most careful feeding and internal treatment relief, is not secured, surgical measures should be adopted, before the infant becomes too debilitated and emaciated. Meltzer gives the average age at onset as two weeks, and that at death as nine weeks and a half; and states "in view of the remarkable uniformity of the statistics, every case that runs beyond four months cannot be one of almost or quite complete occlusion of the pylorus." Cautley thinks "that the noteworthy fact is, that a fatal issue results before the fourth month of life, in infants not operated upon." Therefore, early diagnosis, followed at once by operation, before the infant has had much time to lose weight, or become enfeebled, is especially essential to a successful surgical outcome; even more so, it would appear from the statistics, than the method of operation. Thus, of 40 cases of gastro-enterostomy, with 21 recoveries and 19 deaths, the average age in successful cases at the time of operation was 6·7 weeks; while the average age at time of operation in the unsuccessful cases was 8 weeks. Ibrahims gives 19 cases, with 9 recoveries and 10 deaths; the average age at time of operation in these was 18·5 weeks.

In the case in which divulsion was performed, Scudder gives 11 cases, with 7 recoveries and 4 deaths; the average age in the successful cases was 6·7 weeks. Ibrahims, 14 cases, 7 recoveries and 7 deaths; average age at time of operation, 7·5 weeks. In cases of pyloroplasty, according to Scudder, of 8 cases, 4 recoveries and 4 deaths, the average age of successful cases was 6·1 weeks. Ibrahims, 9 cases; 5 recoveries and

4 deaths; ages not given. The mortality percentages of the four methods of operation taken from Scudder's, Ibrahims', and Fisk's tables are as follows:—

			Scudder, p.c.		Ibrahims, p.c.		Fisk, p.c.
Gastro-enterostomy	...	...	47'7	...	52'6	...	42'5
Divulsion	...	...	36'3	...	50	...	{50 55'5
Pyloroplasty	...	...	50	...	44'4	...	{45'4 27'2
Pylorectomy	...	...	100	...	100	...	100

If the relative percentage for the several operations is to influence the selection of the method of operation to be used, there would appear to be but little choice between gastro-enterostomy, pyloroplasty, and divulsion. But judging from the number of operations relatively in each group, and the opinions of the different writers, gastro-enterostomy appears to be the operation of choice. (*See also* PYLORUS, CONGENITAL HYPERTROPHY OF.)

Ulcer.—I was asked by the Council of the Royal Medical and Chirurgical Society to open a discussion on "The Operative Treatment of Ulcer of the Stomach, and its chief complications, with indications, limitations, and ultimate results." This paper and the interesting discussion which followed will be found in the *British Medical Journal*, November 17th, 1906. The paper concluded as follows:—

"I should like it to be understood that I do not advise operation in ordinary acute gastric ulcer, the medical treatment of which should, I think, be much more careful and more prolonged than was formerly considered necessary.

"Nor do I advise operation in chronic ulcer before medical treatment has had a fair trial; but I think it is unfair to our patients to advise a continuance of general treatment for chronic or relapsing ulcer until serious complications supervene, when by timely surgical treatment many of them can be prevented.

"In perforating ulcer, in chronic or relapsing hæmorrhages, in pyloric obstruction or other mechanical causes leading to dilatation, medical treatment is as inadequate and useless as is operative treatment in gastric neuroses and other functional diseases, and to continue it beyond the period in which it can benefit is as unscientific and unwise as it is to operate and expect good results in improper cases."

In the Hunterian Lectures⁸ given at the College of Surgeons, H. J. Paterson described some original observations that he had made on the effect of the operation of gastro-enterostomy on the metabolism of the human body, which distinctly showed that Joslin's experiments, which had been made on patients suffering from cancer, could not be relied on when the operation was performed in cases of simple disease of the stomach. In none of the operations did the unabsorbed nitrogen amount to more than 2 per cent above the amount usually passed in the fæces by a healthy individual, while the amount of fat unabsorbed did not on any occasion exceed 7'7 per cent of the fat

taken in the food, that is just over 2 per cent above the amount usually passed in the fæces by a healthy man.

REFERENCES.—¹*Handbuch der speziellen Pathologie und Therapie innere Krankheiten*; ²*Surg. Gyn. and Obst.* 1906, No 1, abst. in *Brit. Med. Jour.* May 12, 1906; ³*Lancet*, Nov. 18, 1905; ⁴*Presse Méd.* July 1, 1905; ⁵*Brit. Med. Jour.* May 6, 1905; ⁶*Ann. Surg.* Feb. 1906; ⁷*Ibid.* July, 1906; ⁸*Lancet*, Feb. 24 and Mar. 3, 1906.

STRABISMUS.

A. Hugh Thompson, M.D.

Mackay¹ investigated 125 cases with the object of determining whether, in cases of strabismus with or without amblyopia, the defect in muscular co-ordination is connected in any way with a defect in the light sense. He tested the light sense in the affected eye by comparing it with that of its fellow, both for the minimum amount of light perceptible and for the minimum difference perceived. He found that the great majority of affected eyes have a normal light sense, and concludes that a congenital defect in this is not responsible either for strabismus or for the amblyopia which so often goes along with it. This conclusion may be compared with the suggestion referred to in the article on *Diseases of the Retina*, that slight retinal hæmorrhages occurring during birth may in some cases cause a permanent amblyopia. The suggestion is in accordance with the now generally received theory of strabismus², according to which one of the factors producing a constant squint is an initial difference in the visual acuity of the two eyes, from whatever cause. The fact that this has nothing to do with any difference in the light sense is interesting.

REFERENCES.—¹*Ophth. Rev.* Feb. 1906 (Ophthalmological Society), and *Brit. Med. Jour.* Dec. 23, 1905; ²*Cf. Med. Ann.* 1905, p. 609.

STREPTOCOCCIC INFECTION.

E. W. Goodall, M.D.

An instructive series of cases came under the observation of Latham, Paton, and Brice¹.

Case 1 was a girl, aged seven, who on August 7th, 1905, came under medical care with an attack of ordinary facial erysipelas. She was convalescent in ten days, and was nursed by her mother, a woman thirty-five years of age.

Case 2. This woman was found on August 26th to be suffering from pain and swelling in front of the right shoulder. During the next four days the disease became worse, and the whole of the right side of the trunk and the right shoulder became involved in an acute inflammation of the skin and subcutaneous tissue. Streptococci were obtained from the blood. There were fever and delirium; the case proved fatal on September 7th. There was no suppuration.

Case 3 was the sister of the last patient; she was a woman aged thirty-eight, and had nursed her sister during her fatal illness. On September 6th she felt ill, complaining of pain and tenderness in the right axilla. There was considerable febrile disturbance. Streptococci were found in the blood. The patient was treated with subcutaneous injections of antistreptococcic serum, and recovered, after

an axillary abscess, the pus of which contained streptococci in pure culture, had been opened.

Case 4, a man, aged forty-two, was the father of the patient in case 1. He fell ill on September 28th with a rigor and sore throat. He died on October 8th of streptococcic infection following upon severe suppurative tonsillitis and pharyngitis. An autopsy also revealed acute inflammation of the larynx, pericarditis, and peritonitis. During life streptococci in large numbers were found in the blood.

Case 2 was treated late in the disease with antistreptococcic serum, but unsuccessfully. When case 4 came under treatment on October 3rd his condition was hopeless, and the serum was not used.

REFERENCE.—¹*Lancet*, Mar. 17, 1906, p. 753.

SUBMUCOUS RESECTION. (See NOSE.)

SUPRARENAL GLANDS. (See DUCTLESS GLANDS.)

SYMPATHETIC OPHTHALMIA. (See IRIS AND CILIARY BODY.)

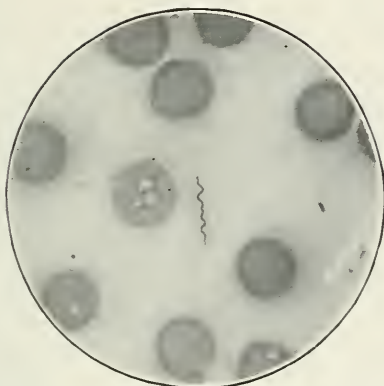
SYPHILIS.

J. W. Thomson Walker, M.B., F.R.C.S.

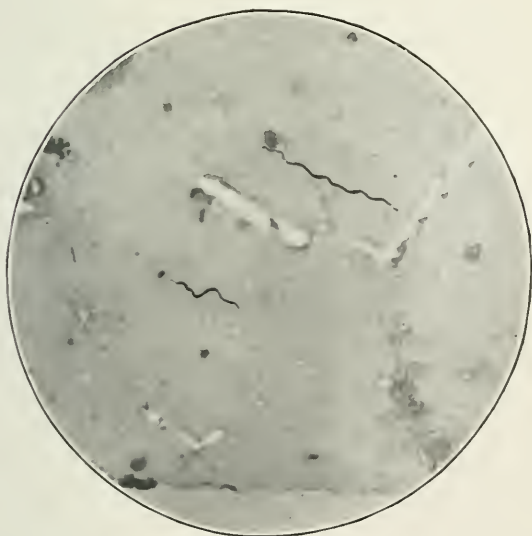
ETIOLOGY.—In last year's *Medical Annual* a description was given of certain spiral bodies observed by Schaudinn and Hoffmann in connection with syphilitic lesions, and claimed by these authors as the causative factor of syphilis. Some support had at that time been lent by the independent observations of such well-known authorities as Metchnikoff and Roux, who found these bodies in syphilitic apes. During the past year much has been written in regard to this subject. In the following description the excellent articles of Fanoni¹, Rosenberger², and Flexner³ in America, and Shennan⁴ and Maclellan⁵ in this country, have been freely used: we are also indebted to M. Levaditi, of the Pasteur Institute, for the excellent coloured drawings (*Plates XXIII, XXIV*), and to Dr. Maclellan for the photomicrographs (*Plates XXI, XXII*), which accompany this paper. In each of these an extensive bibliography is given, and references to over 100 articles will be found in a record by Surg. G. M. O. Richards, R.N.⁶ Schaudinn and Hoffmann described two forms, the *Spirochæta pallida*, or, as it has recently been named, the *Spiromena pallidum* (Vuillemin⁷), and the *Spirochæta refringens*, in connection with syphilis; but the former was that for which they claimed an etiological relationship to syphilis. The *Spirochæta pallida* is a thin, spiral, vigorously motile body, which is very difficult to demonstrate from its slight affinity for stains. It varies from 4 to 20 μ in length, and tapers to a fine point at each end. It is 0.25 μ in breadth. The spirals are regular, narrow, and deep, varying from 6 to 26 in number (average 8 to 10), and are retained after the fixation of the specimen. Terminal flagella have been described by some authors, among whom is Schaudinn. It has been suggested that, when double, these represent the commencing longitudinal fission. It has been stated that they are made up of several shorter individuals pieced together, but these may be degenerative forms.

PLATE XXI.

SPIROCHÆTÆ.



Spirochaeta pallida, $\times 1,000$. Leitz ocul. iv. obj. 1 16 oil immersion, Giemsa's stain (Grübler).
(Fanoni.)



Spirochaeta refringens (*Spirochaeta pallida* was also present in this specimen, but could not be photographed), $\times 1,000$. Leitz ocul. iv. obj. 1 16 oil immersion, Oppenheim and Sach's stain
(Fanoni.)

A swelling has been described between the middle and one terminal third, and a terminal globular body of doubtful nature has also been described. An attached membrane was at first said to be present along the whole length of the body, but this is now denied. The movement may be corkscrew, to and fro, or lashing. The body is said to belong to the protozoa and not to the bacteria.

The *S. pallida* is distinguished from other forms found on ulcerated surfaces by the following characteristics:—(1) The difficulty of staining; (2) The number, character and permanence of the spirals; (3) The presence of terminal flagella; (4) The absence of an attached membrane; (5) From the spirillas by its minute size, its delicacy, and its refractility; (6) It is stained rose-pink with Giemsa's stain, which distinguishes it from other spirochætæ and also from spirilla, which take a blue or purple colour with this stain.

The *S. refringens* is frequently associated with the *S. pallida*, but it is admittedly saprophytic in nature. It is thicker and distinctly refractile. Alive and in motion it may have a corkscrew outline, but when prepared in films it flattens out and presents a wavy outline, the curves of which are flatter and longer than those of the *S. pallida*. It is usually from 8 to 10 μ in length, and may have blunt or tapering ends, or one end blunt and the other tapering. There is an attached membrane, but no flagella are found. It stains easily and deeply, and takes a purple colour with Giemsa's stain.

Ploeger⁸ suggests that all spirochætæ, the spirals of which measure about 1 μ or less, should be placed with *Spirochæta pallida*, and those with spirals more than 2 μ with the *S. refringens*.

The following is Giemsa's method originally used for the demonstration of the spirochætæ:—The slides are fixed in absolute alcohol for half an hour, and are immersed for twenty-four hours in the following solution: Twelve parts of a solution of eosin (2·5 cc. of a 1 per cent solution of eosine in 500 cc. of water); Three parts of azur I. (1 part of azur I. dissolved in 1000 parts of water); Three parts of azur II. (a solution containing 0·8 parts of azur II. to 1000 parts of water). The stained preparations are washed in water, dried in air, and examined with $\frac{1}{12}$ or $\frac{1}{16}$ oil immersion lens.

Schaudinn⁹ recommends preliminary momentary fixation with osmium vapour. In staining by this method the nuclei of the leucocytes should be a deep reddish black.

According to Maclellan, who has tried various methods of staining, "the method of fixation or the stain employed did not make any difference, as where spirochætæ were present they were demonstrable by all the methods."

The spirochætæ disappear rapidly from excised chancres when kept (Kraus and Prantschoff¹⁰); and Metchnikoff and Roux state that they could not be demonstrated in a syphilitic lesion six hours after excision. Shennan remarks the agreement of this with the accepted clinical observation that the syphilitic virus rapidly degenerates after removal from the living body.

In regard to the demonstration of these bodies, Dr. Shennan makes the following observations: In lesions with moist or ulcerating surfaces the *S. pallida* is commonly accompanied by the *S. refringens*. The number of forms intermediate between the two is remarkable, and it is sometimes extremely difficult, often impossible, to refer these forms to the one or the other group. The more thorough the preliminary cleansing of the moist surfaces, the fewer saprophytic spirochætæ will be seen. *S. pallida* may lie deeply in the lesions and in clumps; several films must therefore be made. It is an advantage to have a little blood in the film, as it assists focussing. *S. pallida* soon degenerate, and are not found after six to ten hours in excised tissues. In using Giemsa's method, the nuclei of the leucocytes should be stained of a deep brownish purple, otherwise the spirochætæ will not be seen. Decolorizers should be avoided if possible. Attempts to cultivate these spirochætæ have been unsuccessful.

The *S. pallida* is said by Herxheimer¹¹ to be most numerous at night. It has been found in scrapings from chancres, in smears from excised chancres and from condylomata, in smears from excised glands, and from fluid obtained from enlarged glands by puncture. It has also been found in the blood taken from the general circulation and in blood aspirated by needle from the spleen before the secondary rash appeared. The spirochæta has been demonstrated in the liver, and in the papules and roseolar spots of the cutaneous rash of secondary syphilis. It has been observed in mucous patches and in an enlarged congested tonsil.

Tertiary lesions have given negative results on examination by several observers, but Spitzer¹² has described the *S. pallida* in tertiary lesions in two cases. Jacquet and Sevin¹³ failed to find the body in 23 tertiary lesions, but Dudgeon¹⁴ found it in a case of tertiary syphilis, and Rille and Volkerodt¹⁵ have also observed it in tertiary lesions. Tomosczewski¹⁶ has carefully investigated 10 cases of tertiary syphilis, and in 5 of these he found the *S. pallida*, while Doutrelepon and Grouven¹⁷ found the organism in 4 cases of syphilis in the tertiary stage. According to the former observer, the discovery of the *S. pallida* has little value in the diagnosis of tertiary syphilis, but he looks upon it as a reliable test for primary and secondary syphilis. The organism has been found in the wall of the aorta in a case of chronic aortitis (Reuter¹⁸). It has been found in the large cells of the decidua by Nattan-Larrier and Brindeau¹⁹. Wallisch and Levaditi²⁰ examined a "large number of placentas from syphilitic women," with negative results except in one case, where the spirochætæ were found in the villi around the slightly thickened vessels and between the large decidual cells.

Simmonds²¹ found the *S. pallida* in the umbilical cord in two cases, and in one of these he found it in the placenta after much difficulty. This author examined 22 cases of infants in which there were no signs of syphilis, and in all the result was negative. In 4 other cases the diagnosis of congenital syphilis had been made during life, but post

mortem these showed no signs of syphilis, and the *S. pallida* was absent. In 4 cases of macerated syphilitic fetuses the organism was found in each. It was found in large numbers in the meconium, which points, according to the author, to the excretion of the spirochætæ by the bowel.

In 5 syphilitic infants the examination was negative, but in 12 others the *S. pallida* was found. These were all syphilitic cases, but they had been preserved for a considerable time. In these cases the spirochætæ were found most abundantly in the diseased organs or in the affected part of an organ. In syphilitic osteochondritis they were only found at the cartilaginous and bony junction and in the neighbouring periosteum. Compared with the macerated fetuses the numbers of spirochætæ were very small and were confined to the affected organs, whereas in the former the organisms were found in every tissue and organ of the body in great numbers. Simmonds suggests that there may have been a post-mortem proliferation of the spirochætæ in the macerated fetuses.

The organisms were particularly numerous in syphilitic pneumonia, and were found in the heart-wall in a case of syphilitic myocarditis. Buschke and Fischer²² have also observed the organism in the heart-wall in a case of syphilitic myocarditis in congenital syphilis. Simmonds concludes that the discovery of spirochætæ in the organs of fetuses and infants sufficed for the diagnosis of syphilis. A negative result would most probably point to the absence of syphilis in macerated fetuses, but in infants should only be used with caution.

Thomsen and Chievitz²³ examined the organs of 15 infants that had died of congenital syphilis. Five of these were macerated, and the spirochæta was not found in 4 of these. In 10 unmacerated fetuses the spirochæta was found in 9. The failure to discover the organism in the macerated cases was looked upon as not due to chancre, but to the disappearance of the organism in decomposing tissues, and it was noted that in the single positive result in a macerated fetus the spirochætæ were present in smaller numbers, and some of them appeared to be degenerating. In macerated syphilitic fetuses, Simmonds found the *S. pallida* in the skin, bones, muscles, brain, spinal cord, lungs, heart, thymus, thyroid, liver, pancreas, spleen, kidneys, stomach, intestine, suprarenal capsules, testicles, ovaries, uterus, prostate, urinary bladder, glands, blood. The organisms were numerous in the spleen, pancreas, and suprarenal capsules, but especially so in the liver and intestinal wall.

The *S. pallida* was found by Metchnikoff and Roux in the initial syphilitic lesion of 4 out of 6 artificially infected apes.

The *S. pallida* has not been found, after careful search, in bubo following soft chancre, in carcinomatous or tuberculous tissue. Nor could Gordon²⁴ discover the parasite in 8 specimens of cerebrospinal fluid obtained from cases of cerebrospinal syphilis. Widal and Ravant²⁵ examined the cerebrospinal fluid of 15 syphilitics with negative result.

Among so great a number of articles there are very few in which the *S. pallida* is not accepted as the causative factor of syphilis. Amongst these Schüller²⁶ does not believe that they are related to syphilis. He had observed them many years previously, but did not believe that they were animal parasites. Cube²⁷ and Omeltchenko²⁸ have also raised objections. The former found the *S. pallida* accompanied by the *S. refringens* in non-syphilitic lesions, such as the pus from a gonorrhœal abscess of Bartholin's gland, balanitis, the discharge from an ulcerating cancer, and the tissue juice of condyloma acuminatum. The latter has observed the bodies described by Schaudinn and Hoffmann, but looked upon them as fragments of fibro-elastic tissue. He also found these bodies in non-syphilitic lesions. Fraenkel²⁹ and Spitzer³⁰ have also stated that they observed the parasite in non-syphilitic lesions. Thesing³¹ looks upon the *S. pallida* as a harmless saprophyte. Siebert³² remarks that there is no analogous disease in which the number of the causative organisms bears no relation to the intensity of the reactions. In syphilis the spirochætæ are usually few in number. Nicholas, Faure, and André³³ are not convinced that spirochætæ found in some non-syphilitic lesions are not *S. pallidæ*. Schaltz³⁴ states that he found the *S. pallida* in 1 non-syphilitic case out of 13 examined. This observer has found the *S. pallida* in a venereal wart which was not of syphilitic origin and was uninfluenced by specific treatment.

According to Persé³⁵, if the lymphatic apparatus be excepted, the spirochætæ are most numerous in organs which are slightly affected or are quite healthy, whereas, in the organs that are most extensively diseased, spirochætæ are not usually recognizable.

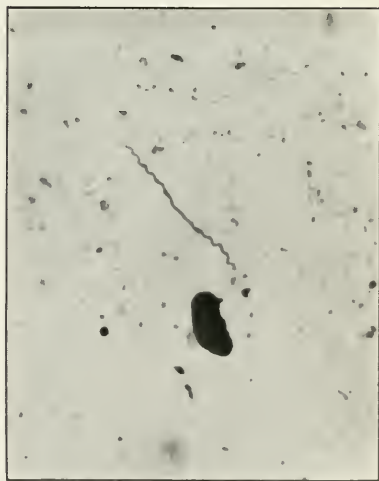
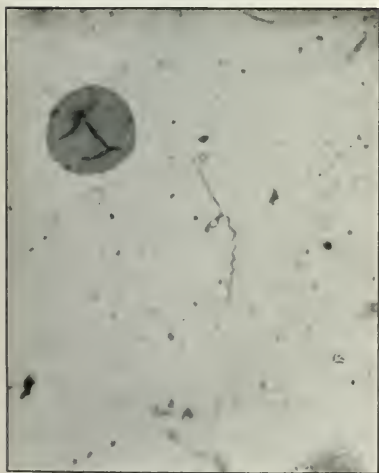
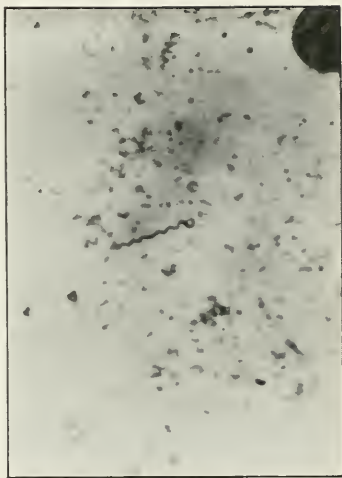
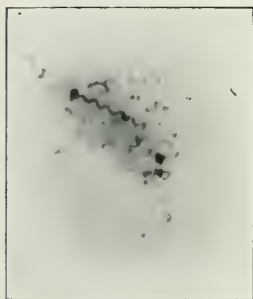
MacLennan makes the following pertinent remarks upon the number of organisms present: "In any case the *Spirochæta pallida* is not found in numbers commensurate to the severity of the lesion. . . . There can be no doubt that this organism stains more readily at one time than another, but even taking this into account, its small representation in the lesion suggests another explanation for the severity of the trouble. In a film populated by every imaginable organism, it is hardly reasonable to take the scarcest, though one of the most striking, organisms present, and label it specific." This observer describes numerous other bodies which may be variations in form or different stages in development of this organism, or may be other independent bodies.

According to Neisser³⁶, material capable of producing syphilis in apes has been found free from spirochætæ.

MacLennan suggests that there may be another agent still unrecognized which is the cause of syphilis. This organism may be the *Cytoryctes luis*, or bodies similar to it. "The prevalence of other forms found more or less constantly in my slides, and sometimes in countless numbers, has led me to infer that the spirochætæ were merely stages in the development of an organism which in all probability is the cause of syphilis."

PLATE XXII.

SPIROCHÆTÆ.



Various forms of *Spirochaeta pallida* ($\times 1,800$).
(MACLENNAN, Photomicrographs by DR. BUCHANAN.)

Korté³⁷ has also described certain bodies, apparently protozoal in character, that he found in the chancre, in the condyloma, and in the blood, during secondary syphilis. He failed to find the *Spirochæta pallida* in the blood in secondary syphilis, and on this account doubts its connection with syphilis.

Von Neissen³⁸ obtained from the blood of 300 syphilitic patients a bacterium of varying form and staining properties, which produced a disease corresponding to syphilis in apes, pigs, and horses, after injection of a pure culture. From the blood of these animals the original bacterium could be obtained. In order to bring this in line with the Schaudinn discovery, one must accept that the *S. pallida*, which does not belong to the protozoa but to the mycetes, is only one of many developmental forms of a polymorphous syphilitic virus.

Ravant and Ponselle³⁹ have examined the blood in syphilitics for the *S. pallida*. Hoffmann has in three cases out of five been able to produce syphilitic lesions in monkeys with the blood of syphilitics, and to recover the spirochæta from the lesions produced. On the other hand, the direct search for the parasite in the blood has almost always been negative. The solitary successful examinations are reported by Raubitscheck, Noeggerath, and Straehelin, who have each found the parasite in one patient, and Nattan-Larrier and Beyeron⁴⁰, who have found it in the secondary period in three patients. These observers have examined 10 cc. of blood, and have had the very greatest difficulty in discovering a few spirochætes. It is more easy to demonstrate the presence of the spirochætes in the blood by inoculation than by direct examination. Ravant and Ponselle have searched for the Schaudinn spirochæte in the blood of many syphilitics. In none of their patients have they been able to discover the spirochæte in the blood. They have, however, been struck, in examining a child suffering from hereditary syphilis, by the considerable number of spirochætes that were present in the blood some hours before death.

Schaltz⁴¹ followed the disappearance of the spirochætes in four cases of syphilis under treatment. A rapid disappearance under the influence of mercury before the development of secondary symptoms would lend support to the claim of this body to be the cause of syphilis. The spirochætes disappeared gradually without any sign of degeneration. Maclellan states that he has been more successful in finding the *S. pallida* after mercury has been administered, and suggests on this account that the organism may take the spirochætal form "when a struggle for its existence begins."

In regard to the nature of the organism, Schaudinn holds the view that the body he described belongs to the protozoa (group flagellata). It is interesting to note that the belief has long been held that the causative agent was protozoal. Jackson Clarke in this country brought forward evidence in this direction many years ago. On the Continent Hügel, Horaud⁴², Holtzhäuser, Schüller⁴³, and Stassano⁴⁴ have supported the protozoal theory. Siegel's bodies, which Schaudinn and Hoffmann set out to investigate when they observed the

spirochæta, were stated by this observer to be a minute flagellated protozoon⁴⁵. Some further work has been done in regard to these bodies, but the belief that they are the causative agent of syphilis is not widespread. Neisser⁴⁶ states that Siegel's bodies have been found by him in normal blood, and points out that rabbits, in which animals Siegel claims to have produced syphilis, are generally considered to be immune from the disease. Lassar⁴⁷ and others have suggested that some of the protozoal bodies described by these observers (Siegel and others) may be found to be related developmentally to the *Spirochæta pallida*.

Jackson Clarke⁴⁸, in a note on some protozoa in syphilis and cancer, says that before the appearance of Schaudinn's preliminary note on another spirochæte, bacteriology had claimed the spirochætes, confusing them with the spiral bacteria or spirilla. Now we know that they are protozoa of most complicated life history, including various forms, some of which, compared to the spirochætes, are giant cells. "Syphilis" he says, "is a disease in which, as we know, the parasite's life cycle is completed within the human host, so that if the *Spirochæta pallida* has to do with causing the disease, the other larger forms must be found in the tissues. They can be none other than the forms that I described in 1894." This observer found similar structures in the primary, secondary and tertiary lesions. He found similar bodies in molluscum contagiosum, sarcoma, and cancer, and in cystic ureteritis. Clarke holds the view which he advanced thirteen years ago, that "the common forms of cancer and sarcoma are caused by more or less local infections by protozoa, and differ from the infective granulomata only in the more intimate character of the parasitism and the more complicated life history of the parasites."

Another line of work in which much has recently been achieved is the production of experimental syphilis in animals. Thibierge⁴⁹ gives an excellent *résumé* of the work that has been done in this subject. Most of this work has already been noted in previous issues of the *Medical Annual*. Metchnikoff and Roux have continued their researches, and in a recent publication⁵⁰ state that the closest analogy to human syphilis is produced in the chimpanzee. In 22 of these animals inoculated, typical syphilitic lesions were produced in each case. The period of incubation averaged 30 days (15-49 days). Eight of the 22 animals presented secondary lesions, and the interval between the appearance of the primary chancre and these secondary lesions was on an average 33 days (19 to 61 days). Fourteen animals did not develop secondary symptoms. Of these, some had been inoculated with attenuated virus, and some died before the time for the appearance of the secondary symptoms. Paralytic affections appeared during the secondary stage in several animals, but the symptoms passed off.

SYMPTOMS.—In an article on syphilitic arthritis, Franenthal⁵¹ discusses three propositions: (1) Many cases of acute arthritis in congenital and acquired syphilis, occurring in the early secondary stage are treated as simple rheumatism; (2) The failure to properly diagnose

and treat these lesions may result in secondary invasion of the tubercle bacilli or other bacteria; (3) Late secondary and tertiary arthritis may be polyarticular and bilateral.

Franenthal argues thus: Sturgis, Bulkeley, and others state that there are 50,000 cases of fresh syphilitic infection per annum in the City of New York. Fournier states that 39 per cent, and Hippel that 56 per cent, of all cases of congenital syphilis have arthritis; and Schuler says that 7 per cent of all joint diseases in children are syphilitic. What are the syphilitic joint diseases of the children of these cases of fresh infection in New York treated for? His answer lies in the first proposition stated above. He describes the forms of syphilitic arthritis, and quotes some cases from his personal observation. He looks upon the discovery of the *S. pallida* as an important means of diagnosis.

In a discussion on syphilis at the Hunterian Society of London⁵², Jonathan Hutchinson stated that not only was the disease on the decline, but that it was generally considered to be of a milder type as a result of more effectual treatment. The mortality from syphilis had reached its maximum in 1875. Tuberculosis, he considered, sometimes complicated tertiary syphilis. Syphilitic lupus was a combination of the two, and some "relapsed chancres" were tuberculous. With reference to marriage, Hutchinson stated that if the treatment were continued for two years from the date of the chancre, a man might safely marry, but a much longer period was necessary for a woman. A man with tertiary symptoms might have quite healthy children. Syphilis could not be transmitted to the third generation. The fact that younger children in syphilitic families were free from the syphilitic taint, and were well grown and robust, was opposed to the belief that the disease, when incapable of transmitting its characteristic symptoms, might still cause arrest of development. Nor was syphilis an appreciable cause of degeneracy of the race.

Purves Stewart pointed out that in many cases syphilis of the central nervous system was an anatomical accident, and affected the non-nervous tissues, and only secondarily the nerve elements. Thromboses, aneurysms, and gummata did not spring from nerve tissue, although the symptoms were nervous. In another class of syphilitic nerve disease, the nerve elements underwent primary dystrophy with production of sclerosis, which was a secondary change. The examination of the cerebrospinal fluid was important. In functional nervous diseases, epilepsy, paralysis agitans, and disseminated sclerosis, the cerebrospinal fluid was apparently normal. With organic diseases of the nervous system, acute microbic meningeal affections and suppurative diseases of brain or membranes, the fluid contained polynuclear leucocytes. In the case of chronic nervous affections—tuberculous and syphilitic—there was always great excess of lymphocytes, usually monomorphic. In syphilis without nervous affection there was no excess. In gummatus affections of the nerve

centres the excess was marked, but in tabes and in general paralysis the leucocytosis was constant and extremely well marked, the average being 130 to the field.

N. B. Potter⁵³ has investigated 300 cases, about half of whom were syphilitic, with a view to estimate the diagnostic value of the smooth atrophy of the follicles at the base of the tongue in syphilis that Virchow drew attention to many years ago. The observations were made by palpation, as visual examination proved untrustworthy. The author concluded that "when the papillary glands at the root of the tongue are normal, syphilis is probably to be excluded, while typical atrophy of these glands in an individual below the age of fifty years is indicative of syphilis. A moderate degree of atrophy is of little diagnostic significance.

Rolleston⁵⁴ describes a case of intranasal chancre simulating nasal diphtheria. The lower two-thirds of the organ were swollen and dusky-red, while the right ala nasi was thickened and very tender, and was lined on its inner surface by a membranous deposit, from which, on pressure, a sanious discharge exuded. There was no excoriation of the philtrum such as is usually present in severe cases of nasal diphtheria. The left submaxillary and sternomastoid glands were swollen and tender. The nose had been painful for a month. There was a rash on the chest and abdomen. Under mercury all the symptoms cleared up. The author was only able to collect sixty cases of intranasal chancre from the literature.

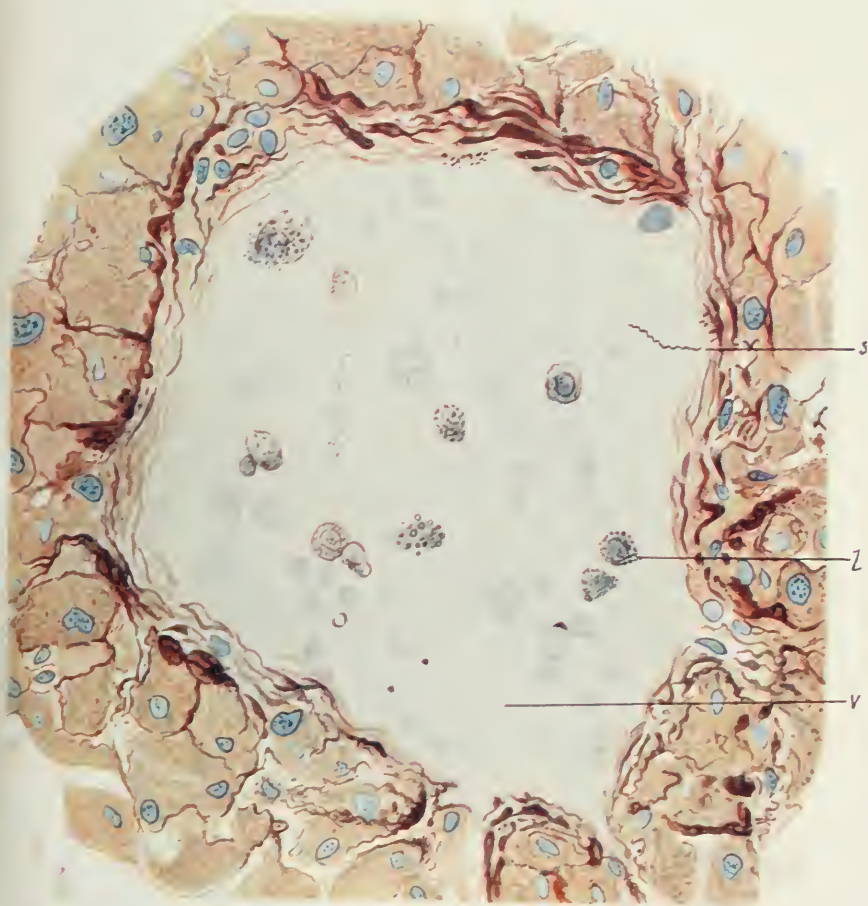
C. M. Williams⁵⁵ contributes an interesting article on the "contagiousness of gumma." "Experience has shown that the vast majority of cases owe their origin to sufferers in the early stages, and that repeated exposures to tertiary lesions have not been followed by infection. Hence arose the generalization that tertiary lesions are not contagious." This is, however, open to doubt. Exposure, even to the virulent primary and secondary manifestations, is often without results, even when escape from infection would appear impossible. Fournier relates that he has repeatedly found that where several men had intercourse with a syphilitic woman, some were infected and others escaped. There are many reasons why the records of transmission from tertiary lesions are rare. The belief in the non-contagious nature of gummata is so firmly established that cases are attributed to other sources of infection, "the physician preferring to invoke chancre or marital infidelity rather than give up his theory." Apart from these omissions, the cases are probably very rare, for several reasons. Tertiary lesions are much rarer than secondary. In Neumann's clinic the proportion was $4\frac{1}{2}$ per cent. Moreover, the tertiary lesions are usually single, while the secondary lesions are multiple. The tertiary lesions are on less favourable sites for the spread of the disease. The virulent secondary lesions, although widely distributed over the body, seldom lead to contagion unless when situated on the genitals. Tertiary lesions have rarely this situation, so favourable for the spread of the disease. Further, the

PLATE XXIII.

SPIROCHÆTA PALLIDA.

Stained by Levaditi's method.

(This and Plate XXIV are from drawings made by M. Roussel, of the Pasteur Institute, in Paris, from Dr. Levaditi's original sections.)



*Section of Liver.—(v) Intralobular venule in which lie red corpuscles and leucocytes (l),
(s) Spirochæte lying free within the lumen of the vessel.*

gummata present so obvious a deformity as to be noticed by any one, and sufficiently alarming to drive the sufferers to seek advice, while a secondary papule may be so insignificant as to be overlooked. The age at which gummata appear is against their spread as compared with the primary and secondary lesions.

It has been said that during the time which elapses before the appearance of the tertiary lesions, the virus becomes more and more attenuated, and finally dies out. This is true in some cases which show no signs after the first or second year, but the late secondary symptoms may overlap the appearance of the tertiary, and the former are admittedly contagious. The mere lapse of time cannot, therefore, reduce the infection in tertiary lesions. The character of the lesion may have something to do with the difference of infection between the late secondary and the tertiary lesion which may occur at the same time. The typical infectious secondary symptoms are the eroded papule and the mucous patch. Both are very superficial, and show no extensive degenerative process, and lose their epithelial covering, leaving the deeper parts of the lesion exposed while they are still in active evolution. The gumma, on the other hand, is a deeper process, and becomes an open sac only after necrosis or caseous degeneration has destroyed, not only the epithelium covering it, but presumably also the infectious agent as well. The author collected 25 cases from the literature, in which there was infection from tertiary lesions quite apart from the infection from late secondary lesions. There are certain objections common to all the cases. The woman may have been unfaithful, the so-called gumma may have been a chancre, an instance of re-infection; or the semen, a urethral mucous patch, or a transitory secondary lesion of the penis may have been the source of infection. Experimental inoculation of the products of gummata lesions has always failed. The author believes that the failure has resulted from using the degenerated material from the gummata, whereas it is only in the developing parts of the gumma that the active contagion may reasonably be looked for. For the same reason the early attempts to inoculate monkeys from gummata failed. Later experiments with material from the spreading margin of gummata have been successful in communicating the disease to monkeys.

TREATMENT.—The large amount of experimental work that has been done in regard to the inoculation of syphilis in lower animals has had for its object the production of immunity in the human subject by means of an antisyphilitic serum or by other forms of treatment. Metchnikoff and Roux⁵⁶ made a series of experiments with **Mercurial Ointment**, rubbing the ointment into the spot of inoculation three quarters of an hour after the syphilitic virus had been introduced. This was found to destroy the infection. An ointment containing 10 parts of calomel to 20 of lanolin was the least irritating of the preparations used. It has been suggested that this might be used as a preventative measure in individuals who have been exposed to infection.

L. Hanck⁵⁷ has studied the condition of the leucocytes in the secondary stage of syphilis before and after the use of mercury. In this stage of syphilis the leucocyte count is normal, and there is no difference between the number of leucocytes in a fresh infection and in a recurrence in an old-standing case. Under the influence of mercury the leucocyte count is changed within narrow limits, and this varies according to the form of administration of the mercury. In the inunction method there is first a fall and then a gradual increase of the number of leucocytes, while in the injection method an immediate increase takes place. In last year's *Medical Annual* a number of formulæ for intramuscular injections in the treatment of syphilis were given. In a report of a discussion on mercurial injections in the treatment of syphilis at the Medical Congress in Paris, in 1905, the following preparations are quoted in the *Medical Press*⁵⁸:

Soluble Preparations.

1. **Perchloride of Mercury.** Barthélemy and Levy-Bing recommend the following formula:—

R	Hydrarg. Perchlor.	0·10 gram		Aq. dest.	10 grams
	Pulv. Sod. Chlor. pur.	0·075 gram			

The chloride of sodium has the advantage of rendering the injections less painful.

The following is used in Germany:—

R	Hydrarg. Perchlor.	1 gram		Aq. dest.	100 grams
	Sod. Chlor.	10 grams			

One cc. of either of these solutions represents 1 cgram of the sublimate, an average daily dose. Should this prove insufficient, the injection may be increased to 2 cgrams daily for 20 days.

2. **Benzoate of Mercury:**—

R	Hydrarg. Oxybenzoat.	0·30 gram		Cocain. Hydrochlor.	0·15 gram
	Sod. Chlor. pur.	0·10 gram		Aq. dest.	40 grams

This must be freshly prepared, as the cocaine precipitates the mercury in a few days.

Britonman and Desesquelle recommend the following solution:—

R	Hydrarg. Benzoat.	0·60–3 grams		Ac. Benzoic.	0·60 grams
	Cocain.	0·12 gram		Aq. dest.	ad 60 cc.

One cgram of benzoate of mercury is a small daily dose; two cgrams may safely be given daily for three weeks.

3. **Biniodide of Mercury.** Pand's formula is an oily solution:—

R	Biniod. Merc.	0·40 gram		Purif. Steril. Olive Oil	100 grams
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This contains 4 mgrams in each cc., and the injection should be at least 2 cc.

By dissolving the biniodide in walnut oil washed with alcohol and sterilized, it is possible to obtain a solution containing 10 mgrams

per cc., and by mixing equal quantities of this oil and castor oil the preparation can be raised to 15 mgrams per cc.

R	Biniod. Merc.	1-1.50 grams	Sterilized Castor Oil	50 cc.
	Oil of walnut	50 cc.		
	(prepared as above)			

To be dissolved at a temperature of 70° C.

This must be kept in coloured phials and not exposed to light. The injection is more painful and less rapidly absorbed than aqueous solutions, and on this account the latter are generally preferred for prolonged daily use, although their action is less pronounced.

R	Hydrarg. Biniod,	0.20 gram	Aq. dest.	10 cc.
	Sod. Iod.	0.20 gram		

The daily dose for three weeks' treatment is 1 cc., containing 2 cgrams. The dose may gradually be increased to 3, 4 or even 5 cgrams. By adding iodide of sodium the solubility of the biniodide is increased.

4. **Cyanide of Mercury.** This is very active in a 1 per cent solution, and does not cause much pain.

Insoluble Preparations.

These consist of **Calomel** or **Metallic Mercury**.

R	Sublimed Calomel	1 gram	Pure Liquid Vaseline	10 cc.
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The three following are formulæ for metallic mercury:—

R	Mercury		Rectified Olive Oil	4 parts
	Lanolin	āā 3 parts		(Lang)

Major Porter, R.A.M.C., uses the following prescription:—

R	Pure Mercury	3ij	Olive Oil	5iv
	Lanolin	3ij		

Dose, 5 minims.

R	Metallic Mercury	20 grams	Vaseline	35 grams
	Lanolin	5 grams		(Brousse & Gay)

R	Purified Mercury	40 grams	White Sterilized Vaseline	13 grams
	Anhydrous Steril. Lanol.	12 grams	Sterilized Liquid Vaseline	35 grams
				(Lafay)

One cc. of any of these contains $\frac{1}{2}$ gram of mercury.

The average weekly dose of calomel is 10 cgrams, and of mercury 7 or 8 cgrams, and the entire course is from 40 to 50 cgrams. As the injections of insoluble salts are made once a week, the usual dose will be 1 cc. of the calomel solution given above, equal to 10 cgrams of the salt and $\frac{1}{7}$ cc. of the metallic mercury preparations (grey oil), equal to 7 cgrams of mercury.

One of the objections to the soluble salts of mercury is the pain that they cause. The following was introduced by M. Midy⁵⁹ with the object of abolishing the pain:—

R	Biniod. Merc.	1 cgram	Chloride of Sodium	2 cgrams
	Iodide of Sodium	1 cgram	Sterile Ozonized Water	1 cgram
	Subcutine	5 cgrams		

This fluid for injection is preserved in bulb tubes of from 1 to 2 cc. capacity. Subcutine, an analgesic, is a compound of an aromatic amine, anæsthesine, with paraphenol-sulphonic acid. Sometimes the bulb tubes containing the fluid show tufts of crystals. These crystals as a rule redissolve if the tube be heated in boiling water. If the crystals redissolve, but collect as an oily globule on the surface of the fluid, the tube should be rejected. Impure subcutine melting at 140° or even 102° C. will cause these changes.

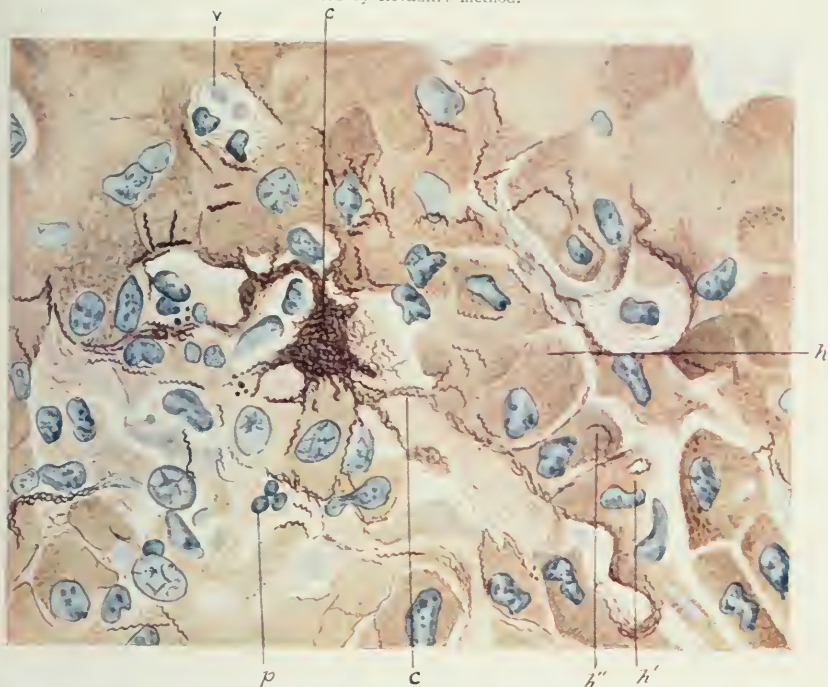
The following are additional preparations of mercury quoted from an article by Campbell Williams⁶⁰:—

R	Hydrarg. Succinimid.	gr. ijss Aq. dest.	℥ c
	Dose—10–15 minims, containing $\frac{1}{4}$ to $\frac{1}{3}$ gr. of the salt.		
R	Hydrarg. Lactatis	gr ijss Aq. dest.	℥ c
	Dose—10–15 minims, containing $\frac{1}{4}$ to $\frac{1}{3}$ gr. of the salt.		
R	Sal. Alembroth	gr. v Aq. dest.	℥ c
	Dose—10 minims, containing $\frac{1}{2}$ gr. of the salt.		
R	Hydrarg. Salicylatis neut.	gr. x Paraffin liq.	℥ c
	Dose—3–10 minims, containing $\frac{3}{10}$ to 1 gr. of the salt.		

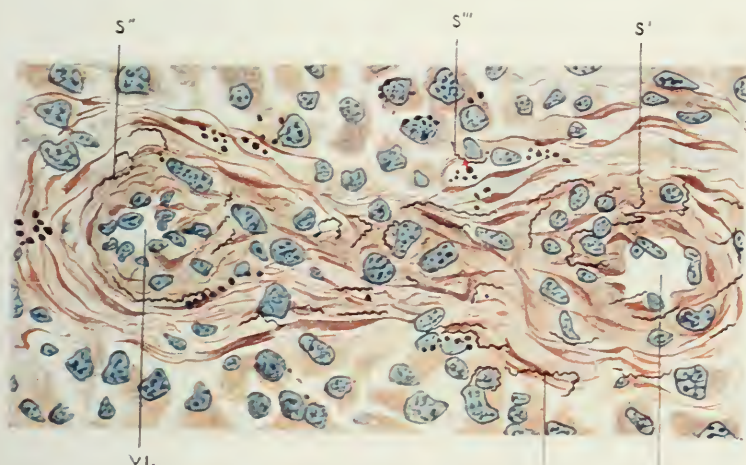
Major Porter, R.A.M.C., gives the following note on the administration of the **Intramuscular Injection** in syphilis in the army⁶¹. “The men stand on chairs by fours, with their backs to a good light. An all-glass syringe holding 20 minims is filled, and a number of cotton-wool swabs wrung out of 1–20 carbolic are prepared. The needle is well rubbed on a swab, and a place having been selected *high up near the crest of the ilium*, it is quickly pushed up to the hilt in a vertical direction, i.e., parallel to the long axis of the body. The piston is then pushed down until 5 minims have been injected, and the needle is quickly withdrawn. It is then thoroughly rubbed through the swab, inserted into the next man, and so on until the syringe is empty. Occasionally a superficial vein is pricked, but pressure for a few minutes by a swab always stops it. I never sterilize the skin of the patient nor treat the needle in any other way, and, after giving many thousands of injections I have never had an abscess nor any other accident. By introducing the injections at the above site, men never complain of difficulty in sitting down, and cavalry soldiers perform all their duties without complaint. I find that most men take 10 continuous weekly injections without their gums getting touched, but occasionally one meets with a man who is intolerant of mercury and cannot take so many. At the end of the tenth injection, the man is invariably quite free from any manifestation of the disease. His name is put on the monthly list, and he comes up for inspection at the end of that period. If he is found to have any fresh manifestation, he is again transferred to the weekly list. . . . No further injection is given for three months. At the end of this time, if the gums are healthy, a further course of five weekly injections is given. Four months from the termination of this course,

PLATE XXIV.
SPIROCHÆTÆ PALLIDÆ.

Stained by Levaditi's method.



Section of Liver.—(c, c). Intralobular space containing a colony of spirochetes. (h, h'') Hepatic cells. (h') Hepatic cell containing a vacuole in which lies a spirochete coiled up. (p). Polymorphonuclear leucocyte. (v), Capillary blood-vessel with several spirochetes in its walls.



Section of Spleen.—(v, v''). Follicular vessels surrounded by lymphocytes and mononuclear leucocytes. (s, s', s'', s'''), Spirochetes lying in the walls of the vessels and between the cells of the follicle.

a further course of five injections ; the next course after an interval of five months, and so on until two years have elapsed."

Le Noir and Camus⁶² described at the Société Médicale des Hôpitaux the case of an adult who had been treated by injections of mercury. Four injections of 7 mins. of grey oil had been made subcutaneously during one month. Three days after the fourth injection, a stomatitis developed which, after four weeks, became gangrenous, with albuminuria, diarrhœa, fever, wasting, and cachexia, until finally death resulted. At the autopsy there were signs of severe enteritis and acute toxic nephritis. The patient appeared to have an idiosyncrasy for mercury. In discussing the case, Tueyrat stated that he treated 6000-7000 syphilitics annually with grey oil, and had never met with a serious accident. Brocq recommended that the kidneys should be watched, and gives **Soluble Salts of Mercury** instead of insoluble in secondary syphilis. Antony objected to the insoluble salts as causing abscess and neuritis, and Thieberge also found that calomel frequently gave rise to abscess when injected.

Sicard also reported a case of a young man in which serious symptoms of intoxication supervened after four injections of grey oil, at intervals of one week. The total quantity of mercury injected was not more than 35 to 40 cgrams. Examination of the buttock showed a large mass, in which the X rays demonstrated a collection of metallic mercury. After removal of this nodosity and its contents, the toxic phenomena disappeared.

Intravenous Injections of mercury have recently been recommended. The therapeutic result is quickly obtained. It is difficult to find a satisfactory preparation of mercury for the purpose. According to Barthélemy and Levy-Bing⁶³, the cyanide of mercury is too toxic, the sublimate coagulates albumin, and the other salts are unreliable in their action or unstable compounds. A mercury salt suitable for intravenous injection should possess the following qualities: It must be completely soluble, must not coagulate albumin, must not be too toxic, must be stable, contain a fixed and known quantity of mercury, and be capable of being readily sterilized. The **Biniodide** of mercury, according to the authors, fulfils these conditions. They have also used the cyanide and the sublimate. They employed 408 injections in 30 patients, all of whom were women. The veins at the bend of the elbow are those most suitable for the injection. The following doses were used: Oxycyanide, '01 gram.; sublimate, '01 to '02 gram; biniodide, '1, '02, '03 gram, dissolved in 1 cc. of water. The injections were painless, but sometimes there was difficulty in finding the veins. In a small number of cases troublesome consequences followed. Locally, ecchymoses, subcutaneous œdema, nodosities, periphlebitis, and the formation of scar tissue resulted; and general toxic symptoms, such as salivation, stomatitis, and diarrhœa were observed. The authors concluded that intravenous injections were useful where a rapid, intense, painless action was desired, but in other respects intramuscular injections produced the same results.

Kamprath⁶⁴ recommends the combination of mercury and arsenic in injections in feeble and anæmic patients. He uses a combination of arsenious acid and basic salicylate of mercury, 1 cc. of the aqueous solution containing 0.0115 gram of metallic mercury and 0.004 gram of arsenic. The treatment was employed in the secondary period of the disease, and only in grave cases and in patients who were anæmic, scrofulous, or enfeebled by syphilitic or other cachexia. In most cases 15 to 18 injections sufficed to cause the disappearance of the symptoms. The injections were well borne, and no local accidents occurred.

REFERENCES.—¹*New York Med. Jour.* Nov. 4, 1905; ²*Amer. Jour. Med. Sci.* Jan. 1906; ³*Med. News*, Dec. 9, 1905; ⁴*Lancet*, Mar. 10 and 17, 1906; ⁵*Brit. Med. Jour.* May 12, 1906; ⁶*Med. Chron.* Feb. 1906; ⁷*Sem. Méd.* 1905, p. 284; ⁸*Münch. med. Woch.* No. 29, 1905, p. 1381; ⁹*Deut. med. Woch.* Oct. 19, 1905; ¹⁰*Wien. klin. Woch.* 1905, No. 37, p. 941; ¹¹*Münch. med. Woch.* 1906, p. 7; ¹²*Wien. klin. Woch.* Aug. 3, 1905; ¹³Quoted Lesourd, *Ann. de Dermat. et de Syph.* June, 1905; ¹⁴*Lancet*, Mar. 10, 1906; ¹⁵*Münch. med. Woch.* 1905, p. 34; ¹⁶*Ibid.* July 3, 1906, p. 27; ¹⁷*Deut. med. Woch.* 1906, p. 23; ¹⁸*Münch. med. Woch.* April 17, 1906; ¹⁹*Gaz. d. Hôp.* Feb. 8, 1906; ²⁰*Sem. Méd.* Jan. 31, 1906; ²¹*Münch. med. Woch.* July 3, 1906, No. 27; ²²*Deut. med. Woch.* May 10, 1906, p. 752; ²³*Sem. Méd.* June 27, 1906; ²⁴*Amer. Med.* July 22, 1905; ²⁵Quoted Nicholas, *Lyon. Méd.* cv. 1905, p. 497; ²⁶*Centr. f. Bakteriöl.* xxxvi. p. 24, 1905, and *Deut. Aerzte Ztg.* June 15, 1905, No. 12; ²⁷*Münch. med. Woch.* July 4, 1905, p. 27; ²⁸*Roussky Vrach.* 1905, No. 29, p. 913; ²⁹*Münch. med. Woch.* 1905, p. 24; ³⁰*Wien. klin. Woch.* Aug. 3, 1905; ³¹*Deut. med. Woch.* Aug. 10, 1905, p. 32; and *Münch. med. Woch.* 1905, No. 28, p. 1337; ³²*Deut. med. Woch.* 1905, p. 41; ³³*Lyon. Méd.* cv. 1905, p. 497; ³⁴*Deut. med. Woch.* Sept. 14, 1905; ³⁵*Münch. med. Woch.* July 17, 1906; ³⁶*Deut. med. Woch.* 1906, No. 3; ³⁷*Pract.* June, 1906; ³⁸*Münch. med. Woch.* July 31, 1906; ³⁹*Gaz. d. Hôp.* July 31, 1906; ⁴⁰*Presse Méd.* Jan. 10, 1906; ⁴¹*Deut. med. Woch.* Sept. 14, 1905; ⁴²*Lyon. Méd.* 1905, No. 23, p. 1223; ⁴³*Centr. f. Bakteriöl.* ref. xxxvi. p. 24, 1905; ⁴⁴Siegel, *Münch. med. Woch.* 1905, pp. 1321, 1384; ⁴⁵*Ibid.*; ⁴⁶*Deut. med. Woch.* 1906, Nos. 1, 2, 3; ⁴⁷*Dermat. Zeits.* 1905, No. 6, p. 418; ⁴⁸*Brit. Med. Jour.* June 2, 1906; ⁴⁹*Gaz. d. Hôp.* Jan. 16, 1906; ⁵⁰*Ann. de l'Inst. Past.* Nov. 25, 1905; ⁵¹*Med. Rec.* May 26, 1906; ⁵²*Lancet*, May 12, 1906; ⁵³*Med. Rec.* June 2, 1906; ⁵⁴*Lancet*, June 16, 1906; ⁵⁵*Med. Rec.* July 14, 1906; ⁵⁶*Ann. de l'Inst. Past.* No. 11, 1905, ref. *Pract.* Mar. 1906; ⁵⁷*Berl. klin. Woch.* July 16, 1906; ⁵⁸*Med. d. Press.* Feb. 7, 1906; ⁵⁹*Lancet*, Nov. 25, 1905; ⁶⁰*Clin. Jour.* Jan. 10, 1906; ⁶¹*Pract.* Dec. 1905; ⁶²*Progrès Méd.* Jan. 20, 1906, ref. *New York Med. Jour.* Mar. 27, 1906; ⁶³*La Syph.* Oct. 1905, ref. *Med. News*, Dec. 23, 1905; ⁶⁴*Wien. med. Woch.* June 2, 1906, ref. *Rev. de Therap. Med. Chir.* July 1, 1906.

SYPHILIS (Congenital).

Prof. G. F. Still, M.D.

SYMPTOMS.—Jonkowski¹ draws attention to the dryness and mobility of the skin in syphilitic infants, especially on the chest and abdomen, but occasionally also on the limbs. In well-marked cases the superficial layer of the skin seems like a shirt made of some fine tissue; and this thin dry layer is apt to crack and bleed. The infants with this condition of skin are usually severely affected with syphilis, and are likely to die early. Comby² draws attention to enlargement of glands in congenital syphilis. The glands often reach an enormous size, so as to simulate tuberculous adenitis. Those of the neck are specially affected, and there is usually with them some coryza or naso-

pharyngeal catarrh. The nature of the glandular enlargement is shown by the rapidity with which the swelling disappears under mercurial inunctions.

The air passages are not very often affected by congenital syphilis, except in the laryngitis which occurs in very early infancy, and which usually goes no further than the production of some hoarseness. Sharp³, however, records several cases in which severe affection of the air passages occurred: ulceration of the larynx in a boy aged twelve years; gumma of the inter-arytenoid space and ulceration of the left arytenoid cartilage in a girl aged twelve years; gumma of the trachea in a boy aged five years; fistula of the trachea in a girl aged ten years; and a perforation of the soft palate in an infant aged three months. He emphasizes the fact that such affections may occur without any of the classical symptoms of congenital syphilis, such as Hutchinson's teeth, interstitial keratitis, or flattening of the bridge of the nose. Mattosso⁴ also records a case as laryngeal affection in congenital syphilis: the infant, aged four months, had stridor from birth, with no other evidence of congenital syphilis. Under injections of biniodide of mercury, it gradually lost the stridor and recovered. It is difficult to understand upon what grounds this case is distinguished from the disorder known as congenital laryngeal stridor, which is certainly not syphilitic. Tuber⁵ describes as syphilitic the case of a girl aged thirteen years, in whom one lung showed fibrous thickening of the pleura and a purulent infiltration of the lower lobe; the liver, spleen, and kidneys were lardaceous, but apart from this there was no evidence of syphilis.

Joint affections are not very rare in congenital syphilis. Findlay and Riddell⁶ describe a case of chronic synovitis with gummatous thickening of the capsule in many joints, simulating rheumatoid arthritis in a girl aged nine years; she had also Hutchinson's teeth and interstitial keratitis. The present writer⁷ has described a condition of syphilitic arthritis or "osteo-arthritis" with osteophytic changes which in some cases resemble Heberden's nodes; it would seem that these joint affections are usually associated with interstitial keratitis. The nervous system is affected in a considerable proportion of cases of congenital syphilis. The present writer⁸ found cerebral affection of one kind or another in 10 per cent of children with syphilis, and probably the proportion is even higher. Often it takes the form of idiocy; out of 15 cases of syphilitic cerebral affection in children mentioned by the writer, 4 were cases of progressive mental degeneration commencing at about five to eight years of age, 3 were idiots from birth, 1 was hydrocephalic, and 1 hemiplegic, while 3 showed chronic meningitis with cortical sclerosis. Locomotor ataxy is almost unknown in childhood, but does result in very rare instances from congenital syphilis. Bertolotti⁹ reports 2 cases in which the disease occurred at the ages respectively of twenty years and forty years in patients the subjects of congenital syphilis.

TREATMENT.—*Prophylactic*.—Gaston¹⁰ emphasizes the preventable

nature of congenital syphilis. He says that every man who has had syphilis ought to undergo an energetic treatment with mercury, and then after the lapse of three or four years he may safely beget children. Every woman who becomes pregnant from intercourse with a man who has had syphilis, whether recently or not, and whether she herself has syphilis or not, should be treated with mercury throughout the whole period of pregnancy.

It might be added that antisypilitic treatment is necessary for adults with inherited syphilis before they beget or conceive children, if it be true that syphilis may be transmitted to the third generation. The evidence, however, is not at present very conclusive. Marshall¹¹ reports a case in which there were saddle nose and frontal bossing in the infant of a mother who had destruction of the palate owing to congenital syphilis. Fournier¹² has collected 116 cases of supposed affection of the third generation, but nearly all these were merely faults of development, "dystrophic stigmata," which might be due to many other causes than syphilis. About 14 per cent were supposed to show active syphilis in the third generation.

Therapeutics.—There seems to be little likelihood that any drug can replace mercury and potassium iodide in the treatment of congenital syphilis, but there is considerable difference of opinion as to the doses required and the best mode of administration. Probably the simplest and best method in cases of infantile syphilis is to give **Grey Powder** in doses of $\frac{1}{2}$ to 1 gr. three or four times daily; and if there is any tendency to looseness of the bowels, **Pulv. Ipecac. Co.** in doses of $\frac{1}{8}$ to $\frac{1}{2}$ gr. according to age, may be given with the grey powder. The present writer (loc. cit.) points out that in these small doses mercury is not likely to injure the coming teeth, and that the grey powder is less apt to cause looseness of the bowels than the **Liquor Hydrargyri Perchloridi**, which, however, is more suitable in some cases when powders of any sort are apt to be vomited; the dose of the liquor is 4 to 10 mins. for an infant during the first year of life. **Calomel** in doses of $\frac{1}{12}$ to $\frac{1}{6}$ gr. given two or three times daily is thought by some observers to be more rapid in its effect than grey powder, but it has more tendency to cause diarrhœa. The inunction of **Unguentum Hydrargyri** should be used in addition to the oral administration of mercury in cases where it is important to get the child rapidly under the influence of mercury; this combination of external and internal administration is probably preferable to the use of large doses of the drug internally. Even in infancy, however, reliance is to be placed, not on mercury alone, but on **Potassium Iodide** also. Children tolerate potassium iodide well, and will take it even in large doses without inconvenience. Sharp (loc. cit.) used 25 gr. three times a day for a child aged five years, whilst to an infant aged three months 5 drops of a saturated solution of potassium iodide were given three times a day.

It seems very doubtful whether there is any syphilitic condition in infancy or childhood which cannot be treated just as effectually by oral or inunction methods, properly used, as by any injection of mercury.

Solomon¹³ records the case of an infant aged eighteen months who had been treated by inunction without success, and was therefore subjected to **Intravenous Injections** of 1 cc. of a 1-100 solution of **Cyanide of Mercury**; after three injections the syphilitic patches on the mucous membrane of the mouth disappeared.

REFERENCES.—¹*Med. Obstr.* 1905, p. 473; ²*Arch. Ped.* July, 1906; ³*Ibid.* 1905, p. 181; ⁴*Rev. Mensuel. des Malad. de l'Enf.* Oct. 1905; ⁵*La Clin. Inf.* April, 1905; ⁶*Glasg. Med. Jour.* Jan. 1906; ⁷*King's Coll. Hosp. Rep.* vol. viii. p. 366; ⁸*Pract.* July, 1904; ⁹*Brit. Jour. Child. Dis.* Feb. 1906, p. 72; ¹⁰*Ann. de Méd. et Chir.* Jan. 15, 1906; ¹¹*Lancet*, Aug. 26, 1905; ¹²*Bull. de l'Acad. de Méd.* lxi, No. 26; ¹³*Ann. de Méd. et Chir. Inf.* July 1, 1903.

SUPPURATION (Treatment by Passive Congestion). (See INFLAMMATION.)

TABES.

Purves Stewart, M.D.

In a masterly review of the pathological anatomy and pathogeny of tabes, Ferrier¹ comes to the conclusion that the most feasible hypothesis is that the essential lesion of tabes is a dystrophy, probably toxic in origin, affecting the sensory protoneurone as a whole, and manifesting itself in degeneration of its intraspinal prolongations, viz: the exogenous fibres of the posterior columns. The dystrophic process, however, is not strictly confined to this sensory neurone, but may attack other neurones, as for example, neurones in the optic nerve, in the sympathetic, and even certain motor neurones, though this latter is unusual. The toxin of tabes is generated or conditioned by the syphilitic virus. He quotes statistics which point strongly to the fact that tabes and general paralysis of the insane are in all cases syphilitic in origin, and that tabes *per se* is as much a proof of syphilis as a gumma of the skin. The relative infrequency of tabes amongst persons who have suffered from syphilis is, says Ferrier, no argument against the syphilitic origin of tabes, but it suggests that in addition to syphilis there must be some other predisposing or co-operating cause. The most important accessory cause is probably over-exertion or fatigue. The influence of sexual excess and of exposure to cold has been over-estimated, so also has the influence of a neuropathic heredity. As to trauma, whilst it cannot be denied that it precipitates or accelerates the onset of tabes in some patients, it only does so in persons who have already had syphilis. According to Ferrier, tabes is probably due to a toxin of syphilitic origin. This toxin differs from ordinary toxins, however, inasmuch as the disease is a progressive one, and does not tend to come to a standstill as in other toxin-caused degenerations. He believes that the reason for the greater vulnerability of the intramedullary portion of the sensory protoneurone is to be associated with the absence of the protective and regenerative influence of the neurilemma in the central nervous system. He quotes observations by Purves Stewart², which show that lymphocytosis of the cerebrospinal fluid is constantly present, both in tabes and in general paralysis of the insane, from the very start, and that this lymphocytosis is uninfluenced by the

most energetic antisyphilitic treatment, unlike cases of tertiary syphilis of the central nervous system, in which treatment by iodide of potassium and mercury produces a rapid diminution in the lymphocytosis.

Tabetic ataxy, according to Ferrier, is the result of sensory deficiencies, especially of impairment of afferent impressions, whether conscious or unconscious, from joints, muscles, and tendons. He ascribes the pupillary symptoms in tabes, and more particularly the Argyll-Robertson phenomenon, to degenerative changes in the ciliary ganglion. He emphasizes the importance of thorough treatment of syphilis in the prevention of subsequent tabes, inasmuch as the majority of cases of tabes and of general paralysis are found to have been insufficiently treated for their syphilis, though this is not invariable.

REFERENCES.—¹*Lumleian Lectures*, 1906; ²*Edin. Med. Jour.* May, 1906.

TAPE-WORM (Treatment of).

Robt. Hutchison, M.D.

Kingston Fowler¹ speaks very highly of the following method, which almost invariably results in the expulsion of the whole of the worm:—

1. The patient is kept in bed.
2. For two or three, or in some cases four, days the patient is given a diet consisting of: Beef tea, two pints; Mason's essence, one tin: two rusks; and port wine, 4oz. During the same period the patient takes tabloids of cascara sagrada (gr. ij) three times daily.
3. On the fourth day (usually) at 5 a.m. haustus sennæ co. ʒj; at 9 a.m. a capsule containing ℥xv of the extract of male fern; at 9.15 ditto; at 9.30 ditto; at 9.45 ditto; at 11 a.m. haustus sennæ co. ʒj. If by 1 p.m. the worm has not been passed and the head found, a second course of treatment with male fern at intervals of fifteen minutes is begun; to be followed in an hour by a purgative draught. If the head is not found, a third course of treatment is prescribed.

It is rarely advisable to continue the treatment beyond this without an interval of a day, as the patient may be somewhat exhausted.

The chief points of difference between this method and that generally adopted are:—

1. *Complete Rest in Bed.*—It is not advisable for patients taking such an inadequate diet as is necessary, to continue at their ordinary occupation.
2. *Prolonged Period of Restricted Diet.*—To ensure that the bowels shall be as nearly empty as possible when the vermicide is administered, it is necessary that a diet which leaves little solid residue shall have been taken for some days, and that for the same period a laxative, such as cascara sagrada, which is said to act most efficaciously when given in small and repeated doses, should be used. The duration of the period of restricted diet depends upon the strength of the patient.

PLATE XXV.



TELANGIECTASES.

3. *The Method of Administering the Vermicide.*—If a single dose is given, it is conceivable that it may pass rapidly over the worm and fail to destroy it, whereas it is possible that the prolonged action of repeated doses is more effective. The nauseous taste of the drug is avoided by the use of capsules.

4. *The Search for the Head of the Worm.*—As the worm usually breaks at a distance of about $1\frac{1}{2}$ in. from the head, and as the portion left is an exceedingly slender filament, a very careful search is necessary to find it. To facilitate this, the pan into which the motion is passed should be covered with black crape, as against this the fine white filament terminating in the head is more readily seen.

REFERENCE.—¹*Brit. Med. Jour.* April 14, 1906.

TELANGIECTASES (Multiple and Recurrent Epistaxis).

A. Brown Kelly, M.D., D.Sc.

Persons in and after middle life frequently have a few telangiectases on the face. These, however, are rarely present in such numbers as to produce disfigurement or attract attention. Cases of what were apparently multiple telangiectases have been referred to by Wickham Legg as "*hæmophilia complicated with multiple nævi*;" and by Chiari as "*blood extravasations of the skin and mucous membranes in hæmophilics*." Probably the first undoubted case was described by Rendu in 1896. Subsequently, Professor Osler wrote an excellent description of the affection, based on the observation of three cases (he has since seen a fourth): Dr. C. O. Hawthorne reported another; and the writer has published an account of two cases, and has since met with a third.

The telangiectases of the skin first appear as tiny, dark, subcutaneous spots. As they increase in size they reach the surface, and later, project beyond it. The larger ones may form elevations 3 to 4 mm. in diameter, of a dark purple colour. In my first patient the disease reached an unusually advanced stage, numbers of the telangiectases on the cheek having coalesced to form tortuous dilated vessels (*Plate XXV*).

The patient is usually between twenty and thirty years of age when the "spots" are first noticed. Their development is not steady; a period during which they increase in number and size may be followed by another during which they seem to be stationary.

The regions most frequently affected are—the cheeks, lips, ears, nose, and fingers, less often the scalp and trunk, and rarely the limbs. This sequence is also approximately that in which they invade these parts.

The cutaneous telangiectases rarely give rise to symptoms. Occasionally painful tension is experienced in the larger ones, and in those beneath the finger-nails. In the mucous membranes of the mouth and nose, telangiectases have been found in all the cases examined. The parts of the mouth affected are, most frequently, the lips and the dorsum of the tongue; less often, the edges or under surface of the tongue, the cheeks, gums, and palate. *Plate XXVI* shows the mouth

of one of my patients. A specially large group of tiny telangiectases, crowded together so as to appear like a single one, is situated at the tip of the tongue; a few others are dotted over the dorsum; and five are situated about the middle of the hard palate.

The appearances in the nose vary. In my first patient the telangiectases were studded over all parts of the nasal fossæ open to inspection, but especially the septum, and inferior and middle turbinates anteriorly, as bright red, tiny dots, or short, thin lines. They were all small, the lines being as a rule not more than 2 mm. in length. In my second case they were larger and more like purple vesicles; while in my third case, in which the cutaneous telangiectases were confined to one side of the face, a number were found on the floor of the corresponding nostril just beyond the junction of skin and mucous membrane. The extremely thin covering of the telangiectases in the nose, and their projection beyond the general surface of the mucous membrane, render them very liable to rupture.

No telangiectases have been observed in the pharynx, nasopharynx, or larynx, but at the post-mortem examination of one of Osler's cases a dozen round foci resembling ecchymoses, each 3 to 4 mm. in size, which proved to be dilated venules and capillaries, were found in the stomach.

Epistaxis has been the first morbid sign to attract attention, and for which medical aid has been sought in the majority of the recorded cases. The patient whose mouth is depicted in *Plate XXVI* was an exception, the hæmorrhages from her lips and tongue having all along been more important than those from the nose. A liability to epistaxis has been noted in these patients, even from childhood. In and after middle life, the hæmorrhages become more frequent and more profuse, owing to the marked development of telangiectases about this period.

The question has been raised as to the presence of hæmophilia in this disease, owing to the occurrence of profuse epistaxis, and the severe hæmorrhage that may follow the wounding of a cutaneous telangiectasis. Careful enquiry, however, has shown that cuts do not bleed more than ordinarily unless a telangiectasis is involved; besides, the characteristic signs of hæmophilia are absent.

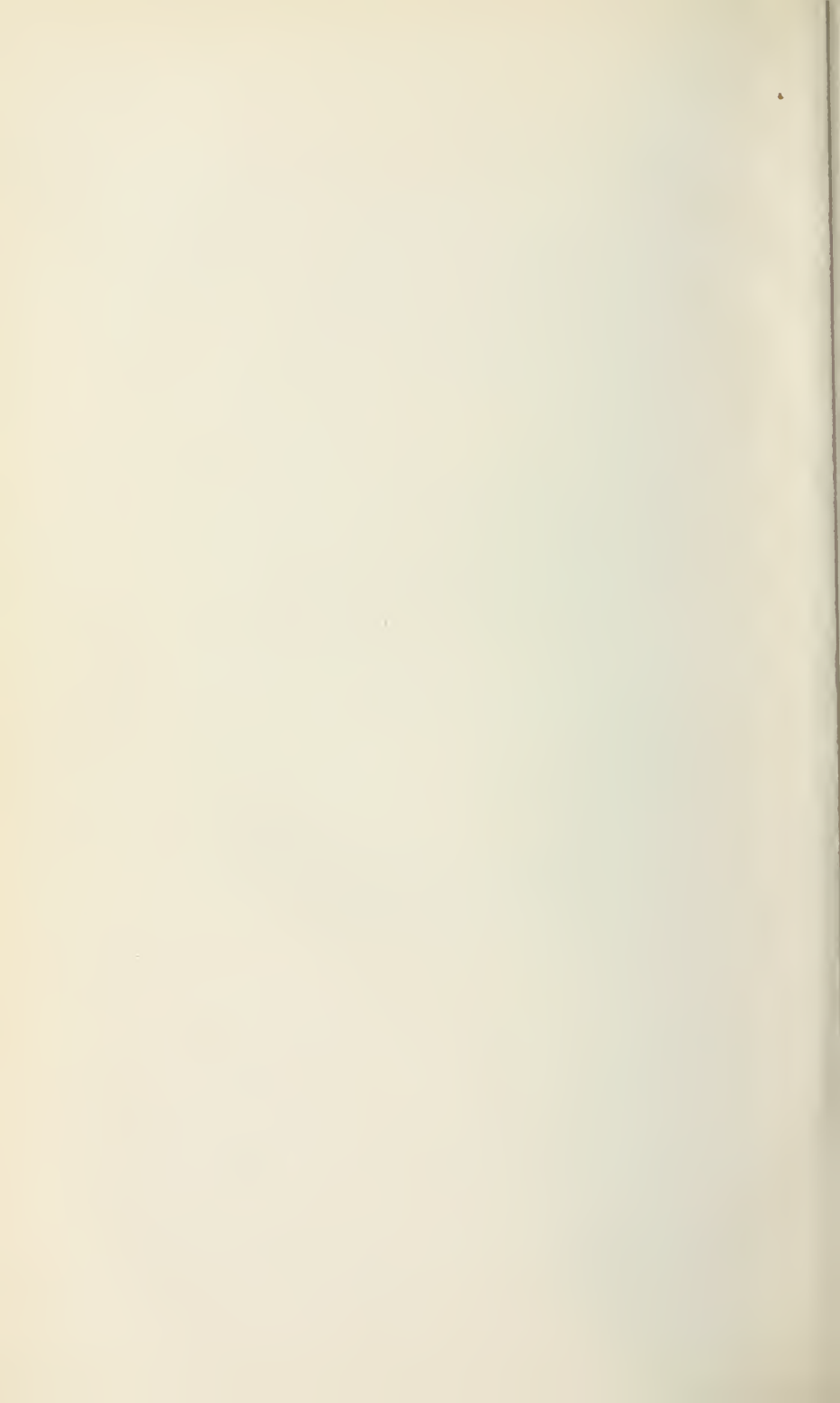
The attacks of epistaxis observe no periodicity. One patient may have frequent comparatively slight bleedings; in another they may occur only at long intervals, but then with such severity as to threaten life. The onset may follow the slightest injury, sneezing, stooping, etc., but often it may be from no assignable cause, as during sleep. The amount of blood lost varies greatly. Almost all the patients have repeatedly suffered from symptoms of anæmia. My first patient (*Plate XXV*) died from syncope induced by profuse and persistent epistaxis.

In none of the cases recorded has any constitutional condition, or any peculiarity in the patient's habits or mode of life, been detected, which could account for the telangiectases. When examined, the organs

PLATE XXVI.



TELANGIECTASES OF MOUTH.



have almost invariably been found healthy. The state of the blood was investigated in Osler's patients, and in my second case, but the results shed no further light on the subject.

A striking characteristic of the disease is the comparatively large number of the patient's relatives that suffer from epistaxis. Osler, in consequence, referred to the affection as "a family form of recurring epistaxis." Another peculiarity is its tendency to affect more than one member of a family, e.g., two of Osler's patients were brothers; Chiari's two cases were in sisters; as were also two of mine. These features, together with the fact already mentioned, that the epistaxis sets in before the telangiectases develop, suggest the presence of an abnormal state of the blood-vessels in these subjects.

The nature of the abnormality, and the manner in which it arises, are unknown. In this connection I may refer to my third patient, aged thirty-five, who is unique in that the telangiectases are confined to one side of the face. When about eight years old she had an affection of the right upper jaw, for which an operation was performed. Since then, the skin of this cheek has been of a faintly bluish tint, and the corresponding half of the upper lip has drooped.

The treatment of this disease, so far, has aimed at increasing the coagulability of the blood in order to diminish the hæmorrhages, and at the control of the bleedings by local measures. The former has probably been best accomplished by the administration of **Calcium Chloride**. On one occasion Osler injected hypodermically 250 cc. of 1 per cent **Gelatin Solution**. As for the local treatment employed, Rendu tried plugging unsuccessfully, but stopped the bleeding by applying to the mucous membrane several times daily the following powder: antipyrin 50 grams, tannin 1 gram, and powdered sugar 10 grams. **Peroxide of Hydrogen** and **Adrenalin** on cotton-wool pledgets are worthy of trial. In one of Osler's cases the angiomata of the septum were **Cauterized**. Alarming hæmorrhage followed, but the patient was ultimately benefited. Subsequently he had occasional epistaxis, which he successfully controlled by means of a rubber finger-stall distended with air. Galvano-cauterization is inapplicable when the telangiectases are very numerous.

REFERENCES.—Wm. Osler, *Johns Hop. Hosp. Bull.* Nov. 1901. p. 333; A. Brown Kelly, *Rev. Hebdom. de Laryngol.* No. 17, 1906, and *Glasg. Med. Jour.* June 1906.

TENDONS, Suppuration in Sheaths of. (See INFLAMMATION.)

TESTIS (Misplaced).

Priestley Leech, M.D., F.R.C.S.

Katzenstein¹ says that, in spite of its supposed rarity, many soldiers were excused from service in the Austrian army on account of misplaced testicle. He recommends the following operation as giving good results: the testicle is freed from adhesions by careful dissection of the inguinal canal, an incision is made in the lowest part of the scrotum, and the testicle is then pulled down by a pair of dressing

forceps passed through the incision. The gland is then sewn to a small flap of skin which is dissected up from the inside of the thigh, and is also stitched to the edges of the scrotal wound. After the vas has been sufficiently stretched by the constant traction (three weeks as a rule is required), the connecting bridge of skin is cut through and the gland released.

REFERENCE.—¹*Berl. klin. Woch.* Dec. 18, 1905.

TETANUS.

Purves Stewart, M.D.

The treatment of tetanus is still a matter of discussion, largely owing to the varying results obtained by different observers who have employed the tetanus antitoxin. Most clinicians are agreed as to the advisability of employing antitoxin when available, preferably (as explained in last year's *Medical Annual*) by intrathecal injection through a lumbar-puncture needle. Kuster¹ recorded a case of tetanus occurring by accidental inoculation with tetanus bacilli in a bacteriological laboratory, in which he **exposed the Nerve-trunks** of the upper limb (the wound was in the hand) and injected the antitoxin into the median, ulnar, and musculospiral nerves, also into the nerve-trunks above the clavicle. The next day the spasms disappeared and never returned. Tetanus toxin, it may be remembered, reaches the central nervous system along the peripheral nerves. Kuster admits, however, that this method of administration should be reserved for cases seen within the first two or three days after the appearance of the symptoms, since intraneural injections can only act by blocking absorption along the nerves.

But supposing that tetanus antitoxin is not available, or that it appears to be inefficient in checking the disease, we may bear in mind the striking results obtained by the hypodermic administration of a 4 per cent solution of **Carbolic Acid**, as suggested by Baccelli and carried out by numerous Italian observers, amongst whom we may quote Felici² and Maremmi³. In Felici's case the patient, a man of eighty, had already been treated for four days by means of antitoxin without effect, but he ultimately recovered when treated by the carbolic acid injections. One cc. of the solution was injected every two hours, and afterwards at more frequent intervals. These injections were maintained daily for fifteen days, during the first ten of which the patient had no less than 18 cc. during the twenty-four hours, latterly diminishing to 12 cc. daily. No toxic signs were produced, in the urine or elsewhere.

Besides the specific action of antitoxin and of carbolic acid on the tetanus poison, we can also alleviate the spasms symptomatically by various **Spinal Anæsthetics**, such as eucaïne and morphine, injected through a lumbar puncture needle. Blake⁴ has also recorded a case treated by the intraspinal injection of a 25 per cent solution of **Magnesium Sulphate**, from 4 to 5 cc. of the solution being injected at a time, and repeated every thirty-six hours or so. Such treatment of course is but palliative, yet if combined with some

form of specific treatment, it may in some cases be of use, though Johnson⁵ noted a case in which magnesium sulphate injections were of no avail.

REFERENCES.—¹*Proceedings of German Surgical Congress*, ref. in *Ann. Surg.* Dec. 1905; ²*Il Policl.* Jan. 1906; ³*Ibid.* Jan. 14, 1906; ⁴*Ann. Surg.* Mar. 1906; ⁵*Ibid.*

TETANY.

Purves Stewart, M.D.

Within the past few years a number of important papers on this affection have appeared. An excellent account of the disease is given by Howard¹ in a recent *résumé* of the subject. From a study of the statistics, tetany appears to be specially common in certain cities. In Vienna, for example, the disease is relatively more frequent than in Berlin. Tetany is commonest in winter and spring, especially during the months of March and April. It is a disease chiefly of infant and of early adult life, 60 per cent of cases occurring before the age of 20. In infancy, the male sex seems slightly more frequently affected than the female. In older patients, members of the working classes, especially those who pursue a sedentary occupation, such as shoemakers and tailors, seem more liable.

ETIOLOGY.—Tetany may be epidemic, for example in "workman's tetany," or the so-called "shoemaker's cramp." This form of the disease occurs chiefly in the winter months, as already mentioned. It is sometimes accompanied by slight fever, it lasts two or three weeks, and is of comparatively mild type. Epidemics have also been recorded in schools, asylums, and prisons. Secondly, tetany occurs in certain gastro-intestinal disorders, as in diarrhœa, dyspepsia, dilatation of the stomach, and intestinal worms. Hecker² believes that intestinal disturbance is not the cause but merely a coincident, inasmuch as tetany is rare in summer, when intestinal catarrh is most prevalent. Gastric tetany is one of the best-known varieties, since its original description by Kussmaul in 1869. In gastric tetany, an attack is often precipitated by severe vomiting, or by the passage of a stomach-tube to empty the dilated stomach. Tetany also occurs in a few cases in the course of acute infectious diseases, such as enteric fever, influenza, measles, scarlatina, etc. It may also follow poisoning from chloroform, morphine, ergot, lead, and alcohol. Tetany of pregnant, puerperal, and nursing women is another well-recognized form, and Trousseau originally described the disease under the name of "nurses' contracture." It may develop for the first time during pregnancy and recur in successive pregnancies; more commonly the onset is during lactation or during the latter half of pregnancy. It has been suggested by Thomas³ that the tetany of pregnancy is associated with some abnormality in the function of the thyroid gland. Tetany is also associated with removal of the thyroid, or rather of the parathyroid glands, a condition well recognized by surgeons. It may also occur as a complication of other nervous diseases, such as intracranial tumours, syringomyelia, and exophthalmic goitre.

Tetany in children is associated, in from 70 to 90 per cent of the cases, with rickets; but curiously enough, it is the mild and not the severe cases of rickets which are most frequently associated with tetany, and many infants with tetany show no signs of rickets.

MORBID ANATOMY.—No constant changes have been demonstrated in cases of tetany which have come to autopsy. Various inconstant changes have been described in the anterior horns of the spinal cord, in the peripheral nerves, etc., but it is more than doubtful whether these are more than coincidences. In one of Howard's cases the parathyroid glands showed signs of unusual activity in the presence of excessive numbers of karyokinetic figures within the cells, a somewhat suggestive observation.

PATHOGENESIS.—Various theories have been suggested to account for the disease. Kussmaul's original theory of dehydration, or drying of the tissues from continual loss of fluid, was proposed by him to explain the occurrence of the disease in cases of dilatation of the stomach; but it does not explain the other varieties of the disease, and Kussmaul himself afterwards abandoned it. Germain-See advanced a reflex theory, according to which the disease was the result of irritation of the sensory nerves of the stomach; but this theory is untenable on account of the fact that the overwhelming majority of gastric affections are unaccompanied by tetany. Then there is the theory of intoxication, which seems more attractive. Two organs have been suggested as the site of production of the toxin, viz., the stomach and the parathyroid glands. As to the stomach, Bouveret and Devic⁴ extracted from the gastric juice in a case of tetany a substance which, when injected into dogs, produced typical spasms. This substance they believed to be a peptotoxin. As to the parathyroid glands, it is a suggestive fact that tetany does not occur in cases of thyroidectomy unless the parathyroid glands are removed.

SYMPTOMS.—The characteristic feature of the disease is the muscular cramps. The exciting causes of a paroxysm are over-exertion and exhaustion, muscular effort, emotion, an attack of vomiting or diarrhoea, gastric lavage, pressure on the affected limb, and so on. There are usually definite prodromata in the form of numbness or tingling in the extremities. The actual spasms are bilateral, usually commencing at the periphery of the limb, and consisting of tonic cramps, spreading upwards towards the proximal muscles. The hands are most typically affected, giving rise to the so-called "obstetrical hand," in which the fingers are flexed at the metacarpophalangeal joints, extended at the distal joints, whilst the thenar and hypothenar muscles are contracted so as to deepen the palm of the hand, and the thumb is strongly flexed across the palm. The hand may then be flexed at the wrist and drawn to the ulnar side, and if the more proximal muscles are affected, the forearm may become pronated, the elbow flexed, and the shoulder adducted. In the lower limbs, the feet assume a position of talipes varus, the toes being flexed into the soles. In severe cases, the knee and even the hip may become flexed. Occasionally the facial muscles may be thrown into

a tonic "risus sardonicus." Spasm of the muscles of the jaw, though rare, does sometimes occur. Spasm of the larynx is a fairly common complication in children, the so-called laryngismus stridulus. If this occurs in adults, it increases the gravity of the prognosis.

There are also certain accessory phenomena which are characteristic of tetany. These are known by the names of Trousseau's, Chvostek's, and Erb's signs respectively. *Trousseau's phenomenon* consists in the fact that pressure on the nerve-trunks and main blood-vessels of the affected limb will induce a paroxysm of tetany. *Chvostek's sign* consists in increased mechanical irritability of the motor nerves and muscles on direct percussion. Thus, tapping over the facial nerve causes spasm of the facial muscles on that side. *Erb's phenomenon* is an increased excitability of the motor nerves and muscles, both to faradism and to galvanism. It is almost invariably present.

Albuminuria is frequently present both during and immediately after the paroxysm.

DIAGNOSIS.—The chief diseases to be excluded are tetanus, hysteria, meningitis, and epilepsy. In tetanus the spasms are more continuous, and begin in the masseter muscles. Moreover there is a history of some source of infection by the tetanus bacillus. Hysteria may simulate tetany, but hysterical spasms are rarely bilateral, and there are frequently other stigmata of hysteria in the form of anæsthesiæ, affections of the special senses, etc. Meningitis produces a different posture from that of tetany, and the cerebrospinal fluid will show an excess of leucocytes of one or other variety, a condition not found in tetany. In Jacksonian epilepsy the spasm always begins unilaterally and lasts for a shorter period than in tetany. If the spasm of Jacksonian epilepsy becomes general, consciousness is lost.

PROGNOSIS.—This is usually good, especially in pregnancy and lactation, also in the variety occurring in rickety children. But the tetany of gastric dilatation is very serious, over 70 per cent of cases proving fatal; and in the surgical tetany following operations on the thyroid gland, death is very common.

TREATMENT.—In every case we must attack the underlying cause, e.g., rickets, diarrhœa, vomiting, pregnancy, lactation, etc. In the gastric variety the stomach should be washed out frequently with large quantities of warm fluid, either plain water, normal saline solution, or some mild antiseptic such as boric acid or permanganate of potassium. **Diaphoretics** and **Diuretics** should also be administered. In cases associated with gastrectasis, gastro-jejunostomy is indicated, so as to prevent stagnation of the stomach contents and stop further toxic absorption. In the tetany of pregnancy and in cases associated with thyroid deficiency, **Thyroid Extract** appears to give better results than parathyroid extract, contrary to what might have been expected. During the actual paroxysms little can be done beyond alleviating them by means of massage, hot baths, and absolute rest in bed.

REFERENCES.—¹*Amer. Jour. Med. Sci.* Feb. 1906; ²*Samml. klin. Vortr.* 1903; ³*Johns Hop. Hosp. Bull.* 1895, vol. vi.; ⁴*Rev. de Méd.* Paris, 1892.

THORAX (Surgery of the).*Priestley Leech, M.D., F.R.C.S.*

Rixford¹ thinks that recurrences of malignant growths in the thoracic wall might be operated on much more frequently than they are. In the modern operation for removal of cancer of the breast, the subcutaneous tissues, etc., are removed down to the intercostals and ribs, and any local recurrence is nearly certain to involve the chest wall. He reports six operations, and the following technique is based on the experience gained in these cases. A wide skin incision is made, so as to be easily closed by a plastic procedure. The chest is then opened through an intercostal space at some distance from the tumour, in order to permit of exploration of the inner surface of the ribs. By this means much can be learned of the extent of the growth and of involvement of the lungs and pericardium. The ribs are first cut on the outer side, preferably without cutting the pleura. No untoward symptoms were noticed when the pleura was opened, and artificial respiration is not needed. The author found that the respiration could be greatly modified, and the tremendous lateral excursions of the heart and mediastinal tissues almost completely checked, by the simple procedure of stopping up the opening in the chest wall with a wet towel. The towel, folded into two or three thicknesses, is slipped beneath the loosened section of chest wall which is to be removed, and is drawn forward as new cuts are made. It is important to close the opening with the towel at the moment of complete expiration, when the chest is largely emptied of air. When air accumulates in the cavity by gradual leakage, the towel can be readjusted. The opening was closed by a skin flap.

Tuffier² holds that the pneumatic chamber of Sauerbruch is cumbersome and complicated. On the other hand, Brauer has invented an apparatus for increasing the intrapulmonary pressure while the pleura is exposed to the normal atmospheric pressure. The face of the patient is enclosed in a glass case (after anaesthesia has been established), in which the air can readily be condensed by mechanical means. Tuffier has used this apparatus in two cases with satisfactory results, but both this and Sauerbruch's method are complicated.

Deruginsky³, of Moscow, describes an interesting case of resection of the thoracic wall and of the diaphragm, for sarcoma, with recovery from the operation. He tamponned the cavity, and used no special apparatus. The edge of the remaining piece of the diaphragm was brought up to the seventh rib, and sewn there, so as to separate the thoracic and abdominal cavities from each other. Recurrence took place.

Sir William Macewen⁴ gave the Cavendish Lecture on "Some Points on the Surgery of the Lung." It is a most interesting and delightful address, and contains many suggestive points. He says that pneumothorax is not always produced by a wound of the thorax, as the two layers of the pleura stick to one another in some cases. The cohesion is due to capillary attraction between two moist surfaces. In cases of pneumothorax, if it persists to a marked extent and threatens

pulmonary collapse, open the pleural cavity by removal of a portion of rib, if necessary, as near the seat of the pulmonary injury as possible, and close the wound in the lung by suturing the visceral layer of the pleura where possible. Then place the two pleural layers together by bringing the parietal into contact with the visceral layer; this must be effected by firm pressure on the chest and diaphragm. Cohesion will again occur between the two layers of the pleura, and the pneumothorax will disappear. Maintain the aperture in the costal pleura until the wound in the lung is healed, or at least until it has been firmly sealed by exudation. He thinks the primary shock which ensues on the admission of air to the pleura, and which follows the collapse of the lung, is probably due to its effects on the heart. When one lung is collapsed, the heart loses some of its support, and the blood in the lung which was collapsed is thrown back, and dams up to some extent the right heart.

REFERENCE.—¹*Ann. Surg.* Jan. 1906; ²*Bull. et Mém. de la Soc. de Chir. de Paris*, 24, 1905, quoted epit. *Brit. Med. Jour.* Oct. 7, 1906; ³*Ann. Surg.* May, 1906; ⁴*Med. Rec.* 1906.

THYMUS GLAND. (See DUCTLESS GLANDS.)

THYROID GLAND. (See DUCTLESS GLANDS.)

TICK FEVER. (See SPIROCHÆTOSIS.)

TROPICAL ULCER. (see LEISHMAN-DONOVAN BODIES.)

TRYPANOSOMIASIS.

J. W. W. Stephens, M.D.

H. W. Grattan and E. W. Cochrane¹ record the occurrence of this disease in the Sierra Leone Protectorate amongst the West Indian Regiment. They emphasize the value of gland palpation and puncture as a means of diagnosis.

Koch² considers that it is impossible to distinguish some of the pathogenic trypanosomes as found in the blood, but that it is possible by means of developmental forms found in flies which transmit these trypanosomes. Male and female trypanosomes are found in the fly. The male type is narrow, has no blue-staining plasma, and has a compact dark-staining rod-shaped nucleus. The female is broad, has a large amount of blue-staining plasma, and a round nucleus of loose texture. He thus distinguishes *T. brucei* from *T. gambiense*: *T. brucei* (♀) found in *G. morsitans* and *G. fusca*, has a small blepharoplast 1.0 μ in diameter, and is 25 μ long; whereas *T. gambiense* (♀) has a blepharoplast 2.5 μ long, lying at right angles to the long axis of the trypanosome, and is 37 μ long. He thinks that in this way it will be possible to distinguish *T. brucei* from *T. evansi*, but Novy has already shown that these differ in cultures.

Minchin Gray and Tulloch³ show that tsetse flies, e.g., those caught on uninhabited islands, may have naturally two species of trypanosomes in their gut, which have therefore no connection with *T. gambiense*. They consider the process of transmission as being due entirely to

contamination, and that there is no developmental cycle in the fly, as in the anopheline in the case of malaria, for they partly fed flies on infected animals, then the meal was continued on a healthy animal (*A*), then again interrupted, and the flies placed on a second healthy animal (*B*). It was only animals in the *A* series that became infected; *B* escaped, i.e., the proboscis is cleaned of contaminating trypanosomes in the *A* animal.

Nattan-Larrier and Tanon advise scarification of the erythematous patches in trypanosomiasis, for detection of the trypanosomes, as they may be found in this way when absent in the blood.

Lorand⁴ considers sleeping sickness to be a myxœdematous condition depending upon changes in the thyroid gland.

D'Aguiar finds that the distribution of sleeping sickness and *Glossina palpalis* is identical. By clearing palm trees and thick bush and planting with sugar cane, cotton, maize, etc., a disappearance of the flies is effected.

PATHOLOGY.—F. W. Mott⁵, from an examination of the tissues, concludes that chronic trypanosome infection causes a lymphadenitis and a chronic inflammation of the lymphatics of the central nervous system, which manifests itself by chronic interstitial change affecting the lymphatics of the soft membranes, the subpial septa, and the perivascular spaces, without any marked destruction of the neural elements. There follows a neuroglia cell proliferation, and then the characteristic lymphocyte accumulation and proliferation.

Distribution of Trypanosomes in the Body.—P. van Durme⁶, studying this question in the case of rabbits inoculated with *T. brucei*, finds that at one stage or another of the disease, trypanosomes occur in the following organs: testis, epididymis, lymphatic glands, conjunctiva, nasal mucosa, œdematous skin, being in fact the organs which show clinical and pathological signs of being affected. Trypanosomes were never found in the liver, kidney, suprarenals, lungs, brain, spinal cord, thyroid, sub-orbital and lacrimal glands, thymus, bone marrow, or ovary.

Trypanosomiasis and Horse-flies.—E. E. Austen⁷ summarizes our knowledge on this question. *Mbori*, a disease of dromedaries at Timbuctoo, and *soumaya* or *souma*, a disease of horses and humped cattle at Ségou, are propagated by *Tabanus ditaniatus* and *T. biguttatus*. *El Debab*, a very fatal disease among dromedaries in Algeria, is transmitted by *Atylotus nemoralis* and *A. tomentosus*.

Cattle disease in Sudan.—A. Balfour⁸ describes trypanosomiasis in cattle in the Khartoum district due to *T. nanum*. It is chronic in character. The symptoms are anæmia (well seen in the blanched conjunctiva), emaciation, running from the nose. Post mortem, there is an extensive subcutaneous gelatinous exudation. In the fourth stomach are ulcerations, with black deposits of altered blood. Enlarged and hæmorrhagic glands in various situations. *T. nanum* is only 10–14 μ in length, by $\frac{1}{2}$ –2 μ broad. There is practically no

free flagellum, and the undulating membrane is very straight and so but little evident. The nucleus is central and the blepharoplast posterior. The protoplasm is homogeneous. So far only cattle have been infected with this trypanosome. In the blood of mules, small and large trypanosomes have been found, but whether these are *T. dimorphum* or not remains at present uncertain.

TREATMENT.—J. L. Todd⁹ recommends the following method of administering **Atoxyl** in the treatment of trypanosomiasis in man. It must not be given by the mouth. Make a 20 per cent solution. The solution, warmed to about blood heat, should be injected subcutaneously. For 4 to 6 days 0.6 cc., then for 4 to 6 days 0.8 cc., then 1 cc. daily until signs of intoxication commence to appear; when this happens the dose is reduced until the limit of the patient's tolerance is reached. The dose is then kept at this point. The treatment must be a prolonged one.

In the treatment of animal trypanosomiasis, nagana, mal de Caderas, and surra, "**Dichlorobenzidine Acid H**" is the best remedy at present available, according to the researches of M. Nicolle and F. Mesnil¹⁰.

REFERENCES.—¹*Jour. R.A.M.C.* 1906, p. 525; ²E. D. W. Greig, *Ibid.* p. 621; ³*Proc. Roy. Soc., Ser. B*, vol. 78, No. B525; ⁴*Presse Méd.* Dec. 6, 1905; ⁵*Brit. Med. Jour.* Aug. 1906; ⁶*Arch. de Par. May*, 1906; ⁷*Jour. Trop. Med.* April, May, 1906; ⁸*Ibid.* Mar. 1906; ⁹*Brit. Med. Jour.* May 1906; ¹⁰*Ann. de l'Inst. Past.* July, 1906.

TUBERCULOSIS ("Zomotherapy" in). (See also SERUM-THERAPEUTICS.)

Robt. Hutchison, M.D.

R. W. Philip¹ speaks highly of the effect of feeding with raw meat in tuberculosis. Richet and Héricourt found, in the case of dogs inoculated artificially with tuberculosis, that all such animals fed in the ordinary way speedily underwent a progressive emaciation, while animals fed on raw meat in one or other form, in place of emaciating, put on considerable weight. They found that the muscle juice freshly expressed from the meat was as efficacious as the meat itself. Cooked meat was of practically no value.

It is usual to order the diet in one of three forms: (1) Pounded raw meat, i.e., finely minced or bruised beef slightly seasoned with salt, etc., served *natural*, like mince collops, cold or gently warmed through-out, say from a quarter of a pound to half a pound twice or thrice daily. The meat should be perfectly *fresh*. (2) Beef juice, prepared as follows. Extract half a pound of *fresh* meat in half a pint of cold water plus half a teaspoonful of salt, for from one and a half to two hours at 35° C. Express the liquid through a cloth. Or the juice may be expressed from the meat directly, without the addition of water, with more powerful pressure. The meat juice must be freshly prepared for use on each occasion. (3) Raw meat soup prepared as follows. Take half a pound of finely minced *fresh* meat, and mix in a bowl with sufficient milk to produce a thick uniform paste.

Immediately before serving add half a pint of milk at 60° C. ; or the soup may be made in a similar fashion, with stock of beef, chicken, or veal, in place of milk.

The clinical results of the method are briefly summarized by Dr. Philip as follows :—

(1) General appearance. This quickly improves. The pallid, soft aspect is replaced by a look of health and vigour. (2) Muscularity. The soft flabby muscles fill up and become firmer. With increasing firmness of muscle the patient's sense of fatigue lessens, and he becomes keen for effort. Myotatic irritability tends to lessen and finally to disappear. (3) Circulation. The pulse-rate is lessened, and a corresponding improvement is effected in the blood-pressure, these phenomena being presumably the expression of improved muscularity in the heart and improved tone in the muscular walls of the vessels. (4) Blood. There is a rapid increase in hæmoglobin. This is conspicuous even in patients who may have made fair progress on a cooked dietary when afterwards placed on raw meat. Within a few days the hæmoglobin runs up from 10 to 20 per cent. There is a remarkable increase in digestive leucocytosis. Negatively, I note that hæmoptysis does not follow the adoption of the method. I have frequently continued raw meat alimentation during the course of hæmoptysis. I emphasize the point, because some physicians would exclude meat in case of hæmorrhage altogether. (5) Gastro-intestinal functions. These become simpler and more effective. Gastro-intestinal discomfort is notably reduced. Intestinal metabolism is simpler and more complete, and the stools improve in character. Detailed observations in relation to gastric digestion by means of examination of stomach washings afford corroborative evidence under this head. (6) Temperature. The temperature is influenced favourably. This depends doubtless on a variety of causes. It frequently follows improvement in gastro-intestinal function. Sometimes, with no other modification of treatment save that under discussion, a highly irregular temperature gives place within a week or two to an almost uniform range about normal. (7) Weight. Here, a distinction must be drawn between increased weight dependent on increase of fatty tissue and that associated with increased size and firmness of muscle. The former increase is of doubtful value to the patient. Sometimes it is positively harmful, the unfortunate individual moving about with increasing difficulty and considerable dyspnoea. On the other hand, increase of weight associated with increased size and firmness of muscle occurs on raw meat alimentation without much addition of fat. (8). Local lesions. All these, in my experience, tend to be influenced favourably, whether occurring in relation to lungs, larynx, glands, intestine, or elsewhere. The change which is evident in superficially disposed tuberculosis, e.g., in glands and skin, is sometimes most remarkable.

TUBERCULOSIS (Surgical).*Priestley Leech, M.D., F.R.C.S.*

F. Putzu¹ records the notes of several cases of surgical tuberculosis treated more or less successfully with the injection of the solution recommended by Durante. The solution is as follows :—

R Metallic Iodine	grams jss	Guaiacol	grams 2'50
Iodide of Potassium	grams 6	Distilled water	grams 50

This solution is injected with a strong Pravaz needle into the affected part: 1 cc. for the first ten days and then 2 cc. being injected. In this manner were treated 4 cases of Pott's disease, of which 3 were successful, 1 case of tuberculous arthritis, 1 of osteoperiostitis of tuberculous origin, and 2 of tuberculous peritonitis. In the same number of *Il Policlinico* several other cases by various surgeons are reported.

REFERENCE.—¹*Il Policl.* Fasc. 24, p. 776, June 17, 1906.

TUBERCULOSIS OF THE KIDNEY.*E. Hurry Fenwick, F.R.C.S.*

Perhaps in renal, more than in any other branch of surgery, rapid strides are being made in accurate diagnosis and treatment; and the advance is due to the use of the cystoscope. Hurry Fenwick¹ has pointed out how an extremely accurate diagnosis of renal tuberculosis can be made in certain latent cases, cases that present none of the usual signs of renal tuberculosis, viz., renal pain, renal tenderness, enlargement of the kidney, temperature, and tubercle bacilli in the urine. The symptoms are those of a slight cystitis, and yet the cystoscopic examination indicates absolutely the presence of renal tuberculosis. The bladder, on examination with the cystoscope, shows a retracted and displaced ureteric orifice on the side of the renal disease, and the bladder wall shows slight tuberculous erosions. The thickened and retracted ureter can often be felt per vaginam. In these cases there is always a thickened ureter which, when it contracts, pulls on the ureteric orifice, and retracts and displaces it. The thickened ureter felt per vaginam is suggestive, but not diagnostic, of tubercle; it means simply chronic ureteritis; it is the *retracted* and thickened ureter that indicates tuberculosis. The condition is only found in 18 per cent of the cases of renal tuberculosis, and is more common in women than in men.

Fenwick points out that in these cases it is the upper and lower poles of the kidney that are chiefly affected, and by timely diagnosis they could be resected and the middle third of the kidney saved. The presence of sepsis alters the aspect of the case, and makes nephrectomy the only resource.

REFERENCE.—¹*Brit. Med. Jour.* Jan. 27, 1906.

TUMOURS (Intrathoracic). *Wilfred J. Hadley, M.D., F.R.C.S., F.R.C.P.*

Shaw and Williams¹ report an interesting case of intrathoracic dermoid cyst, in which the diagnosis was clinched by the expectoration of hairs. The patient was a woman twenty-six years old, who had spit up hairs since she was sixteen. There were prominence over

upper right chest in front, almost absolute dullness to percussion and absence of breath sounds over prominent area; vocal resonance diminished. There were no adventitious sounds, no displacement of heart or liver, and the left chest appeared normal. The sputum was pink, and contained pus, fat globules, and hairs. The skiagram showed opacity over the dull area, but there were no signs of teeth or bones. Reviewing the literature, they find that 35 authentic cases have been reported. These reports bring out the following points. Cases are about equally distributed between the sexes; they commonly first seek treatment between twenty and thirty. The cysts are more commonly in the upper part of chest, and appear to originate from mediastinal tissues. They may be only the size of a pigeon's egg, but a large proportion have been the size of a child's head. In 8 out of 35 cases the cyst has perforated one or other bronchus, and in 7 out of the 8 hair has been expectorated. Hæmoptysis occurred in several; ruptures into pericardium and vena cava have occurred. Some have grown through the upper thoracic opening and appeared in the neck as cystic swellings. The diagnosis is most difficult unless hairs are expectorated. Many of the cases were only found post mortem, whilst others have been thought to be cases of pleural effusion, empyema, aneurysm, pericardial effusion, mediastinal abscess, retrosternal goitre, neoplasms, hydatid cysts, and so forth. These cysts may originate in two ways: They may be (1) Of the nature of teratomata, with parts of included fœtus; (2) Derived from branchial clefts, being wholly, or partly, of epiblastic or of hypoblastic origin. A third group might be made in which the dermoid is combined with various malignant neoplasms.

TREATMENT.—Spontaneous cure is hopeless. Unaided, the cases usually die under thirty-two—though some have lived up to sixty. **Incision**, drainage, and washing out with antiseptics have been employed with considerable relief in some cases. **Enucleation** has been performed in one case with success, but their tendency to attach themselves to surrounding organs and to send off finger-like processes, renders complete removal a very difficult matter. R. Godlee says that the communication of the cyst with a bronchus negatives operation, for fear of a permanent fistula.

Carpenter² reports another case of dermoid cyst springing from the mediastinum which was thought to be one of pleural effusion, and was tapped, yielding "pale, straw-coloured, opalescent fluid," with great relief of symptoms; but the child returned in nine days in a moribund condition, and the cyst was discovered post mortem.

Fitz³ has collected many cases of lipoma of pleura and mediastinum. He showed that several, apparently completely external to chest wall, had prolongations into the chest through the intercostal spaces: whilst others were entirely within the chest and gave rise to all the difficulties of diagnosis common with intrathoracic tumours. Considering the difficulties of diagnosis in cases of intra-thoracic tumours,

the reviewer offers the following table as helpful, though freely admitting that many cases are only rightly diagnosed post mortem:—

Differential Diagnosis in Intrathoracic Tumours.

	ANEURYSMS	MEDIASTINAL GROWTHS	LUNG AND PLEURAL GROWTHS
<i>Pain</i>	Radiating, lancinating, paroxysmal, often anginal; relieved by pot. iod. and rest in bed	More constant; more severe; not relieved by pot. iod. and rest	Not marked
<i>Venous engorgement</i>	One or two trunks may be caught	More general, with veins on surface of chest (collateral)	Sometimes veins on surface, often none
<i>Cyanosis</i>	Rare	A marked feature	Only occasional
<i>Dyspnoea</i>	Often none	Generally much	Often marked
<i>Dullness</i>	Not absolute; generally to right of sternum or in middle, may be posteriorly	Absolute generally in middle and front	Absolute any position
<i>Breath sounds</i>	Feeble or normal	Often absent	Bronchial to absent, variable
<i>Heart sounds</i>	Well heard; bruits common; nearly always diastolic shock	No heart sounds as a rule; bruits rare; no diastolic shock	Feeble or absent; no bruits, no shock
<i>Tracheal tugging</i>	Common	Very rare	Absent
<i>Voice sounds</i>	Normal	Absent as a rule	Often absent
<i>Other pressure signs</i>	"Brassy" cough and other pressure signs common	Pressure not so common; cough not "brassy"	Pressure signs uncommon; cough not "brassy"
<i>Pulsation</i>	Expansile; forcible	Feeble or absent; non-expansile	Very rare
<i>Pleural effusion</i>	Most uncommon	Fairly frequent	Common, often recurrent and sanious
<i>Sputum</i>	Hæmoptysis, streaky or copious	Not common	The rule; "currant jelly" spit
<i>Glands or other growth</i>	Absent	Often present	Only occasional
<i>General appearance</i>	Often quite healthy	Much cyanosed and cachectic	Cachectic
<i>X ray</i>	A definite shadow, more when a good clot, in position of aorta	Much fainter shadow, not necessarily over aorta	Seldom except with effusion
<i>Duration</i>	Over 18 months without cachexia	Course more rapid	Course rapid

REFERENCES.—¹*Lancet*, Nov. 4, 1905; ²*Ibid.* Feb. 8, 1906; ³*Amer. Jour. Med. Sci.* Nov. 1905.

TUMOURS (Multiple Juxta Articular).

J. W. W. Stephens, M.D.

M. E. Jeanselme¹ describes these as fairly common among natives in further India, viz., Canibodia, Siam, and the Shan States. They are subcutaneous, roundish or lobed, or in masses as big as the fist. Their commonest sites are the external malleoli, head of the fibula.

anterior tuberosity of the tibia, the knee, the trochanteric and sacro-coccygeal regions, the olecranon and the acromion process, and the dorsal aspect of the fingers. Their nature is unknown, but the author favours a parasitic origin.

REFERENCE.—*Arch. f. Schiffs u. Trop. Hyg.* Jan. 1906.

TYPHOID FEVER. (*See also* SERUM-THERAPEUTICS.)

E. W. Goodall, M.D.

ETIOLOGY.—The rapid disappearance of typhoid bacilli from water and sewage has been for some time an unsolved problem. But Fehrs's¹ researches go to show that their disappearance is caused by the protozoa, infusoria, and minute entomostraca which abound in unsterilized or unfiltered river water. Fehrs demonstrated the bacilli within the body-wall of certain of the flagellata.

Pierce and Thresh² give an account of a case in which a jar of distilled water was suspected of having given rise to typhoid fever. A man aged thirty fell ill of typhoid fever, the clinical and serum diagnosis being conclusive. There were no other cases of the disease in or about the neighbourhood, nor had there been for a considerable period. Strict enquiry was made as to whether any article of diet might have been taken by the patient and no other member of the household, and it was ascertained that he alone drank distilled water, and that he was in the habit of taking a pint of it the first thing every morning. The water was kept in stone jars having wooden taps; it was found that occasionally the water contained some fluffy material, and emitted an odour of ginger-beer. Bacteriological examination of the water gave cultures of an organism closely resembling the bacillus of typhoid. It was then ascertained that the jar (with others) which contained the water had, before coming to the patient, been sent to a chemist in a town where typhoid fever was epidemic. It was asserted that the jars were steamed before being sent out again with distilled water. But it is quite clear that somehow or other the water had become contaminated with the typhoid-like organisms; and possibly the contamination took place in the town where typhoid was prevalent. The wooden taps may easily have escaped sterilization.

An unusual mode of communicating typhoid fever occurred in the case of a patient who was for some time under the care of Hector Mackenzie and Battle³ in St. Thomas's Hospital. A man, aged twenty-eight, was admitted into the hospital in July, 1902, with typhoid fever. He was operated upon for a perforation of the ileum; he recovered, and was discharged on September 10th. On September 18th he was readmitted for pain in the right femur and knee. This yielded to potassium iodide and local applications, and the man left the hospital at the end of three weeks. On October 18th, 1904, two years later, he was admitted again on account of severe pain in the right femur. He had been quite well until this came on four weeks previously. On November 6th a periosteal abscess was found, and a bacteriological examination of the pus gave a pure culture of

the *Bacillus typhosus*. The man went out on December 21st, the wound being quite healed. A few weeks later it broke down, and a discharging sinus resulted. He did not return to the hospital for treatment till June, 1905. He had himself dressed the wound daily at home in the interval. He continued to treat the wound at home. During the next fortnight his wife developed typhoid fever, was admitted to the hospital, and died there. The husband stated that though his wife did not actually dress the wound in his thigh, she collected the soiled dressings and burnt them. It is highly probable that she was infected from the dressings. A bacteriological culture made of the discharge from the sinus gave pure growths of typhoid bacilli.

Wright and Archibald⁴, of Glasgow, record 7 cases of typhoid fever, in 6 of which the disease appears to have been contracted from the first, a little girl of seven and a half years. The patients were all children from one and a half to nine years old. The first patient, who infected the others, suffered from an indefinite attack of illness for thirty days before she was removed to the fever hospital. The children lived in a block of buildings composed of flats; they were playmates, and played about together in the lobbies and on the stairs. No adults in the families were affected.

Coleman and Buxton⁵ have analyzed the reports of 604 cases in which a bacteriological examination has been made of the blood of typhoid patients. In 75 per cent the typhoid bacillus was found. Of the cases in which the examination was made during the first week of the illness, 93 per cent were positive; in one instance the bacilli were found as early as the third day. Of second-week cases, 76 per cent were positive; of third-week cases, 56 per cent; and of fourth-week cases, 32 per cent. It would seem, therefore, that a general dissemination of the bacilli took place very early in the disease. In 21 cases of relapse, the bacilli were found in 18.

According to Klinger⁶, of Strassburg, **Endo's Medium** is more efficacious than the Drigalski-Conradi medium for the early detection of typhoid bacilli in the stools. Endo's medium is made as follows: To 2 litres of tap-water are added 20 grams of Liebig's extract, 20 grams of peptone, 10 grams of common salt, and 80 grams of sugar. After sterilizing, filtering, and making neutral to litmus, Endo adds 20 cc. of a sterile 10 per cent solution of soda, 20 grams of chemically pure milk sugar, 10 cc. of an alcoholic fuchsin solution, and 50 cc. of a sterile, freshly prepared, 10 per cent solution of sodium sulphite. The fuchsin solution is prepared by adding 10 grams of crystallized fuchsin to 100 cc. of 96 per cent alcohol, and pouring off the solution after 20 hours. An exact observance of these details appears to be essential for the successful use of the medium. It is stated that this method checks the growth of other organisms more completely than does the Drigalski-Conradi medium. The difference between colonies of typhoid and coli bacilli can be observed in eighteen to twenty-four hours.

A report⁷ has been published of the results of previous inoculation in 424 cases of typhoid fever occurring amongst the German troops in South-West Africa. The case-mortality of the 324 not inoculated cases was 11.1 per cent, and of the 100 inoculated, 4 per cent. There were more severe cases, and the complications were more frequent in the non-inoculated than in the inoculated cases. It is stated that the most severe cases in the inoculated were those in which the disease commenced soon after inoculation.

Acute Illness following inoculation with Antityphoid Vaccine.—This case is reported by W. J. Lindsay⁸. A civil surgeon, aged twenty-nine, was inoculated with antityphoid vaccine in February, 1900, while on the voyage to South Africa. He suffered no inconvenience beyond slight local soreness and stiffness. After three months' service in Natal he returned to England in charge of invalids, and in August, 1900, sailed again for South Africa. On August 27th, at 5 p.m., he was inoculated for the second time with antityphoid vaccine. The amount of vaccine used was slightly less than what was suggested as a full dose, and antiseptic precautions were taken. Six hours later there was slight headache. Next morning the headache was worse, and it gradually increased during the day, being accompanied by a feeling of chilliness and by lassitude: the tongue was furred. Next day the symptoms increased, and there were, moreover, slight pain and redness at the seat of injection. The patient had restless nights. On August 30th the headache (frontal) was severe, and the other symptoms, already mentioned, with loss of appetite, were pronounced. There was slight swelling, as well as pain and redness, at the seat of inoculation. The pulse was hard and quick, and the temperature 103.4° F. Next day, the morning temperature was 102.2° and the evening 104°. The constitutional symptoms were the same. By September 2nd the local inflammation had disappeared, but otherwise the patient's condition was much the same: morning temperature 101.2°, evening 103°. Constipation was marked. From that day the patient began to mend, but it was not till September 6th that the temperature became normal. Three weeks later, the patient was able to do some light duty. At no time were there spots, enlargement of the spleen, or abdominal swelling, but the symptoms resembled those of a mild attack of typhoid fever. Lindsay points out that this case is an exception to the rules laid down by Wright, that the severity of the local symptoms is in inverse ratio to the severity of the constitutional symptoms, and that second inoculations are usually followed by local symptoms only.

COMPLICATIONS, ETC.—*Laryngeal Lesions* in typhoid fever are discussed at some length by Chevalier Jackson⁹, of Pittsburg, Pa. His observations are based upon 360 cases of typhoid treated in the Western Pennsylvania Hospital. The laryngeal lesions are divided by him into (1) Laryngitis without ulceration; (2) Ulceration of the larynx; (3) Perichondritis, with or without necrosis of cartilage. Laryngitis occurred in 227 (63 per cent) of the cases, and ulceration in 68 (18.9 per cent). From these figures it appears that amongst the

cases observed, laryngeal affections were more frequent than is the case elsewhere. Jackson states that the condition may easily be overlooked, and that its existence in many of his cases was detected only by laryngoscopic examination. [But even taking that fact into consideration, the proportion of cases with laryngeal lesion of the more severe forms, e.g., ulceration of the larynx, is certainly high. E. W. G.]

Bacteriological examination of the diseased organ usually showed a mixed infection, pyogenic cocci being especially frequent. The laryngoscope (preferably a self-illuminating instrument) should be used in every case of typhoid fever, because laryngeal lesions so often exist without any marked signs, even without any signs at all, these being masked by general septic and toxæmic symptoms. This is a point which the author very strongly emphasizes. He discusses in detail no fewer than 19 ascertained or suggested factors in the causation of the laryngeal complications. He states that "the severity of the laryngeal lesion is in direct proportion to the toxæmia, pyrexia not being in itself a factor, but only an index of the toxæmia. Thrombosis of laryngeal vessels in the mucosa, or deeper, is probably the most frequent local initial lesion."

With regard to the symptoms, he observes that "all the classic symptoms of laryngeal trouble may be absent, or so slight as to escape notice, being masked by the general malady. Categorically, the local symptoms that may be noted are: Pain and tenderness, stridor, dyspnœa, dysphagia, odynphagia, dysphonia, odynphonia, hoarseness, croupy cough, and external swelling on the thyroid cartilage. Expectoration is masked by bronchial expectoration."

PROGNOSIS is good as to life: as to voice, "In 45 out of the 68 cases (66·2 per cent) the ulceration healed without alteration in voice or structure, no visible scar remaining. Permanent deformity, without loss of voice and without stenosis, resulted in 8 cases. Stenosis, requiring surgical relief to enable the abandonment of the tracheal cannula, resulted in 5 cases, all of which recovered good, useful voices of rough quality and uncertain pitch."

The chief points in the treatment are the thorough **Cleansing of the Mouth and Gums**; the inhalation of the vapour of water impregnated with **Benzoin**; in acute œdematous laryngitis, with stenosis, **Adrenalin** solution, 1-1000, as a spray; and if the obstruction is severe, **Tracheotomy**. The paper concludes with a very complete bibliography of the condition.

Typhoid Spine is a condition which does not appear to have been observed or to have attracted attention in this country; and even in North America and on the Continent not very many cases have been described. C. J. Wilson¹⁰ has, however, lately given a full account of a case occurring in England, and with it discusses the nature of the symptoms. In the few cases that have been reported, the patient has usually been a man about twenty-eight years of age. The symptoms come on during convalescence, often at about the time the patient is allowed to sit up, but sometimes much later. The first signs are

weakness and aching in the back, which may disappear, to recur later. In most cases they follow over-exertion. The aching is succeeded by very severe ("agonizing," "exquisite," "excruciating") pain in the back. The slightest movement of the patient, or even of the bed on which he is lying, may bring on the pain, which is paroxysmal. The patient keeps the back as rigid as possible. The acute symptoms last for 2 or 3 weeks to 13 months, the average duration being $4\frac{1}{2}$ months. In some cases there are tenderness and swelling about the loins, and there may be some deformity (kyphosis, scoliosis). In about half the cases there is irregular pyrexia. There are not infrequently present symptoms which point to some affection of the spinal cord: alteration of knee-jerks, anæsthesia, cramp, incontinence of the excreta. The patient may get into a state of nervous excitability. The treatment is **Rest** in bed, with **Fixation of the Spine**. The acute pain may be relieved by **Morphia**. Counter-irritation is of use only in the later stages. In Wilson's case, **Aspirin**, 5 gr. twice a day, apparently gave permanent relief. The prognosis is usually favourable. The cause of the condition is doubtful. According to one set of observers there is inflammation of the periosteum and of the fibrous structures binding the spinal segments together. Others believe the condition to be a "neurosis."

Convulsions are not common during the course of typhoid fever. Osler¹¹ states that amongst 1500 to 1600 cases occurring at the Johns Hopkins Hospital, there were only 8 instances of convulsions. These were observed—

1. At the onset of the disease in 2 cases. One of the patients was a boy aged seven, the other a man aged twenty-five. In such cases the patient was quite healthy up to the time the convulsions came on; and the onset was abrupt. The convulsions were accompanied by coma. The boy was seized while he was walking in the street.

2. During the course of the disease, as a manifestation of toxæmia. In one case they recurred with great severity several times.

3. During the course of the disease, as a result of cerebral complications, thrombosis of the vessels, meningitis, or acute encephalitis. In one fatal case there was found, post mortem, thrombosis of the ascending parietal and parietotemporal branches of the middle cerebral artery. Microscopic examination of these vessels revealed most extensive arteritis.

4. During convalescence, though this is a rare occurrence. Osler states that, as a rule, the prognosis is not grave.

A case of *Acute Ascending* (Landry's) *Paralysis* following typhoid fever, with recovery, has been recorded recently by Albert Schütze¹².

Occasionally, profuse and more or less general *Desquamation* takes place after typhoid fever. Twelve cases have been reported by Beard¹³.

Three interesting cases of *Cholecystitis* are reported by Lejars¹⁴, Findlay and Buchanan¹⁵, and Doerr¹⁶.

PROGNOSIS.—According to R. M. Simon¹⁷, polyuria in typhoid fever is of favourable import. Towards the beginning of the fourth

week, when convalescence is about to take place, the urine increases in quantity from 30 oz. daily to 60, 80, or even 100 oz. Sometimes the polyuria is noticed during the febrile period, before defervescence is beginning.

DIAGNOSIS.—The value of Philipowicz's and Bernard's signs in the diagnosis of typhoid fever is discussed at length by Regis¹⁸. The former consists of a more or less well-marked yellow coloration of the palms and soles. The latter is ascertained by carefully palpating the right iliac fossa. "In a typhoid patient we shall feel two or three small swellings, varying in size from a filbert to an almond. These tumefactions lie parallel to the longitudinal axis of the colon, at a distance of half to one inch from one another. They do not become perceptible until the end of the first week, and usually disappear some days later." According to various authorities, and especially Motta Coco, quoted by Regis, the palmo-plantar discoloration is most common in children, less so in women, and least of all in men. It appears usually during the first week, disappears during convalescence, but reappears with a relapse. It may be regarded as pathognomonic, but is not of any prognostic value. As to Bernard's sign, it is suggested that the swellings are the swollen Peyer's patches in the lowest portion of the ileum.

According to J. D. Rolleston¹⁹, the daily observation of the condition of the abdominal reflex is of considerable value, not only as a diagnostic sign in doubtful cases of continued fever, but as a guide to the state of the disease in typhoid. A summary of his observations is given by himself as follows :—

1. The abdominal reflex is affected in a very large number of cases of enteric fever, the percentage of cases in which it is entirely lost exceeding those in which its normal activity is diminished only.
2. From its absence under the age of fifty being confined to certain nervous diseases and acute abdominal conditions, notably appendicitis and enteric fever, the absence of the abdominal reflex in a given case of continued pyrexia in any patient below fifty is of considerable diagnostic value.
3. The comparatively transient nature of the affection of the abdominal reflex in enteric fever is a striking contrast to the more chronic affection of the knee- and ankle-jerks in diseases associated with peripheral neuritis, e.g., diphtheria.
4. Return of a lost reflex, and, *a fortiori*, resumption of its normal activity, are a valuable indication of commencing convalescence, and often correspond with lysis and characteristic changes in the fæces and urine.
5. The objective sign of return of the reflex is often associated with the return of the subjective feeling of ticklishness normal to the individual.
6. In re-appearance of pyrexia in convalescence, the condition of the abdominal reflex is a valuable index of the nature of the pyrexia. [That is to say, its disappearance or its becoming sluggish would point to a relapse.]

7. No constant relation exists between the condition of the abdominal reflex and that of the tendon reflexes.

8. The frequency, degree, and duration of impairment of the abdominal reflex are, as a rule, in direct proportion to the age of the patient.

Several valuable papers²⁰⁻²⁴ on the diagnosis and treatment of *Perforation* in typhoid fever have been published within the last year or so. Physicians are now beginning to recognize that the symptoms described in most of the text-books of general medicine as being those of perforation, are really those of the succeeding peritonitis. The earliest symptoms are (1) Pain in the abdomen, usually not localized to any one spot, coming on suddenly, and more often than not, severe; (2) Tenderness on palpation, sometimes even on percussion, usually in the lower half of the abdomen, and often most marked on the right side; (3) Muscular rigidity in the same region. There may be others, such as shivering, vomiting or retching, an increased pulse-rate, want of movement of the abdomen on respiration, an anxious expression of face, a fall of temperature, collapse, an alteration in the appearance of the abdomen, etc.; but they are none of them so constant nor so important as the first three given above. **Laparotomy** is certainly justifiable when these three symptoms are present, and should be performed at the earliest opportunity. The leucocyte count is of no value in the diagnosis. Rectal examination has in a few cases proved a useful aid, by revealing tenderness on the right side of the pelvis (Meakins). General anæsthesia is usually preferable to local anæsthesia for the operation: apparently it is difficult by the latter method to render the peritoneum and the bowel sufficiently insensitive.

Other abdominal complications simulate intestinal perforation. Bauer²⁵ reports a case of mesenteric thrombosis; Bryant and Bragg²⁶ one of intussusception; Rowland²⁷ two of inflamed mesenteric glands; Spencer and Goodall²⁸ cases of peritonitis without perforation.

According to Dalziel²⁴, at the Belvidere Fever Hospital, Glasgow, all cases of streptococcal infection of the peritoneum in perforative peritonitis were fatal, however slight the infection and however early the operation; cases due to the *Bacillus coli* almost invariably recovered; the staphylococcus cases held an intermediate position.

Harrington²⁹ reports two cases of abscess of the spleen in typhoid. In one the condition was diagnosed, and the abscess was opened and drained, being reached by removing a portion of the twelfth rib behind. The patient, a man aged thirty-three, recovered.

TREATMENT.—As usual a great deal continues to be written on the treatment of the disease as a whole; but the only paper in which we have found anything novel is that by Ewart³⁰, in which is advocated the "**Empty Bowel Treatment**" ("*traitement à vide*"), or "plenty of food and no fæces." The object aimed at is to give the patient food of such a character that, while it shall supply the waste of tissue that goes on—shall, that is to say, feed the patient satisfactorily—it shall give rise to the minimum amount of fæces. The fæces being diminished,

there will be less material from which septic absorption can go on in the intestines, and further, the surfaces of the ulcers will be kept fairly clean, so that it will be more easy to bring antiseptic agents administered by the mouth "into working contact with the ulcerated surface."

To attain these ends the dietary must be as follows: peptonized whey; white of egg diffused in the whey before peptonizing; the yolk of one egg a day; saccharin or lactose, or better still, glucose in a non-fermentable form, or clarified honey; maltine; oil or cream, one ounce a day; common salt, 10 to 15 gr. to every half pint of whey; watery extracts of vegetables; the juice of various fruits. "Although it is not mathematically accurate to say that no organized remnant and no chemical precipitate can be left in the jejunum by the foods enumerated, this is substantially true. It is for the physician to suit the proportions of each of the latter to the stage under treatment, bearing in mind that it is a mistake to attempt much feeding during the first few days. Even whey may yield more coagulum than can be digested. Two and a half pints of salted whey may be quite sufficient, in addition to plenty of water, pure or flavoured. The whey should not be fortified in the manner described until the turgid abdomen has subsided and the mucous membrane has recovered from its early typhoid disablement. Sugar, albumen, and cream may then be supplied, singly at first, but afterwards jointly, with due regard to the indications afforded by a daily inspection of the stools. As soon as it is quite clear that the fortified whey, which is the basis of the diet, is suiting the digestion, the soup and the spoon-food delicacies—such as honey, fruit, jelly, and the rest—may be added to the dietary one by one; and in a short while the arrears of nutrition will begin to be made good; but the growing total of food supplies will make it the more essential to provide for a daily evacuation."

The agents employed for the local treatment are **Petroleum**, two teaspoonfuls every four hours; and **Vegetable Charcoal** in fine powder, two teaspoonfuls every four hours, suspended in a little water. Further, "an important part of the treatment is the frequent or daily administration of a small morning dose of castor oil (1 or 2 dr.) if the bowel should fail to act at least once every day."

Ewart does not state how many cases he has treated by this method; he says they are few in number, and gives details of only two. But he hopes others will give it a trial. Meredith Young³¹ states that having tried it in ten cases, he was not successful with it; but intends to persevere, as "he feels sure that it is a method which will ultimately win its way to favour," as it "has every appearance of being scientifically correct."

Young and F. J. Smith³² both advocate a more generous diet at an earlier stage of the disease than is allowed by most practitioners: meat, fish, eggs, given in suitable forms. Smith believes that he averts complications and shortens the period of convalescence. Young strongly recommends **Sanatogen** for the emaciation that so frequently follows the disease.

Thistle³³ advocates **Purging**, with a view of clearing out toxic matter *via* the intestine. He states that his colleague on the staff of the Toronto General Hospital, Dr. W. P. Craven, and himself have a list of 100 consecutive cases treated by daily administration of purgatives from first to last, with like result (i.e., without a case of fatal hæmorrhage or perforation) and with a total mortality of two. When a case of typhoid fever comes under his care, he administers a few grains of calomel, followed by $\frac{1}{2}$ oz. of magnesium sulphate or other saline; and he repeats this process day after day. Thistle's paper was read at the Toronto Meeting of the British Medical Association, and in the discussion which followed its reading most of the speakers were averse to the routine use of purgatives all through the course of the disease, and Thistle's views were somewhat strongly criticized.

Conti and Rossi³⁴ advocate the **Cold Bath** treatment. They made observations which show that the treatment increases the blood-pressure, reduces the frequency of the pulse-rate, and abolishes dirotism. If these effects are not produced by the bath, the treatment should be discontinued.

In his paper Young made the following interesting statement: "In the preparation of all foods and drinks containing sugar, it is wise to make a solution of sugar first, and allow this to settle for about six hours; then decant off all except the bottom portion. This bottom portion will, in the case of most sugars, and especially the white crystallized varieties, be found to contain a fine sediment, which is composed mainly of ultramarine, a substance added to give the sugar a dazzling white appearance. The composition of ultramarine is somewhat as follows, according to Mr. W. Thomson: silica, 37.90; alumina, 29.30; soda (Na_2O), 22.60; sulphur, 7.85; earthy residue, 2.35. Again, in the making of barley-water, I would strongly advise the frequent and thorough washing of the barley beforehand, for it is usually whitened artificially by being coated with mica."

Allan Macfadyen³⁵ has succeeded in producing an **Anti-endotoxin** in the case of the *B. typhosus* by injecting intravenously into goats small and carefully regulated doses of the typhoid endotoxin. This is prepared by triturating living typhoid bacilli at the temperature of liquid air in the special apparatus (a grinding-pot) devised by himself and Rowlands, which has been mentioned in a previous number of the *Annual*. Macfadyen has previously obtained a similar antitoxin from the horse. But so far the serum has not been rendered available for curative purposes.

REFERENCES.—¹*Hygienische Runds.* Feb. 1906, quoted in *Lancet*, Mar. 10, 1906, p. 693; ²*Lancet*, Sept. 8, 1906, p. 645; ³*Ibid.* July 7, 1906, p. 26; ⁴*Brit. Med. Jour.* June, 1906; ⁵*Proc. New. York Med. Soc.* 1904, quoted in *Brit. Med. Jour.* Nov. 1905; ⁶*Arbeit. aus dem Kaiserlich Gesundheitsamte*, Bd. xxiv, Hft. 1 1906, quoted in *Brit. Med. Jour.* April, 1906; ⁷*Archiv. f. Schiffs u. Trop. Hyg.* Dec. 1905, quoted in *Brit. Med. Jour.* Mar. 3, 1906; ⁸*Lancet*, Sept. 16, 1905, p. 827; ⁹*Amer. Jour. Med. Sci.* Nov. 1905; ¹⁰*Med. Chron.* Aug. 1906; ¹¹*Pract.* Jan. 1906; ¹²*Berl. klin. Woch.* Feb. 12, 1906; ¹³*Med. Press*, Mar. 14, 1906; ¹⁴*Sem. Méd.* June 27, 1906; ¹⁵*Glas. Med. Jour.* Mar. 1906; ¹⁶*Wien. klin. Woch.* 1905, Bd. xviii, p. 884, quoted in *Amer.*

Jour. Med. Sci. Jan. 1906 ; ¹⁷*Brit. Med. Jour.* Nov. 18, 1905 ; ¹⁸*Med. Press*, July 4, 1906 ; ¹⁹*Brain*, 1906, p. 99 ; ²⁰*Montr. Med. Jour.* Oct. 1905 ; ²¹*Amer. Jour. Med. Sci.* Oct. 1905 ; ²²*Univ. Pennsylv. Med. Bull.* May, 1905 ; ²³*Ann. Surg.* May, 1906 ; ²⁴*Glas. Med. Jour.* Oct. 1905, p. 262 ; ²⁵*Med. Rec.* Jan. 15, 1906 ; ²⁶*Ibid.* Nov. 18, 1905 ; ²⁷*Jour. Amer. Med. Assoc.* Feb. 17, 1906 ; ²⁸*Trans. Clin. Soc. rep. Brit. Med. Jour.* Dec. 16, 1905 ; ²⁹*Lancet*, Nov. 11 1905 ; ³⁰*Brit. Med. Jour.* Dec. 9, 1905 ; ³¹*Pub. Health*, Sept. 1906 ; ³²*Brit. Med. Jour.* Oct. 20 1906 ; ³³*Ibid.* ; ³⁴*Il Morgagni*, Oct. 1905, quoted in *Brit. Med. Jour.* Jan. 13, 1906 ; ³⁵*Brit. Med. Jour.* April 21, 1906.

ULCERS.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Rath¹ describes the method of treating leg ulcers employed by Vörner in the case of patients who cannot get rest.

Inflammation and swelling is first relieved by **Rest, Elevation of the Limb, and Cooling Applications**. When these have disappeared, an **Elastic Bandage** is applied from the toes to above the knee, and over this a second one with the same pressure. The bandages can be removed at night.

Arbour Stephens², founding on the successful results of giving 15-gr. doses of calcium chloride, finds that he often is still more successful with 2 gr. **Calcium Iodide** in non-syphilitic cases.

Sabouraud³ uses **Ferrous Carbonate** as a fine powder or ointment in old ulcers. He finds it an excellent cicatrizing agent, and specially useful in leg ulcers when deep, and even when syphilitic. The entire cavity must be filled with the powder, and over this wadding and a bandage applied ; when crusts form, they are washed off by means of oil of sweet almonds applied with a camel's-hair brush. As an ointment it may be used in vaselin 1-40. In another article⁴, the same author recommends for more stubborn cases that the part be rubbed with **Lunar Caustic**, and then with a rod of **Zinc**, freshly filed so that it is shining. Acid zinc nitrate is formed, and causes a good deal of pain ; the part is afterwards dressed with ferrous carbonate as above.

Ectogan⁵ is recommended in all varicose ulcers, whatever their extent. Rest is also essential, and the part should be well washed, if foul, with peroxide of hydrogen, and then covered with a 20 per cent paste thickly spread on gauze. This dressing is changed every third day, and then less frequently as rapid healing sets in. When the lesion is the size of half an inch, red ectogan plaster is applied underneath a bandage, the whole being changed daily.

REFERENCES.—¹*Derm. Zeits.* Aug. 1905 ; ²*Brit. Med. Jour.* July 21, 1906 ; ³*La Clin.* Jan. 5, 1906 ; ⁴*Ibid.* Feb. 23, 1906 ; ⁵*Nord Méd.* Mar. 1, 1906.

URACHUS (Cysts of).

A. W. Mayo Robson, F.R.C.S.

W. R. Weiser¹, in reporting 3 cases of cyst of the urachus that have come under his own observation, refers to 86 cases that he has been able to collect from various sources. This does not include 3 of my own, which, with the 3 reported by Dr. Weiser, brings the number of recorded cases up to 92.

Neither the diagnosis nor the treatment of smaller cysts is difficult, but the larger cysts filling the whole of the abdomen, as in my last case, and closely investing the underlying viscera, present almost insuperable difficulties in diagnosis. They have been mistaken for tubercular peritonitis, for ascites, and for ovarian tumour. All that can be done for the condition is to open and drain the cyst, as it is impossible to separate the cyst wall from the viscera, which can be seen through the posterior cyst wall when the tumour is opened.

REFERENCE.—¹*Ann. Surg.* Oct. 1906.

URETER (Diseases of).

E. Hurry Fenwick, F.R.C.S.

The ureter has attracted increasing attention from surgeons during the last few years, and although little progress has been made, either in knowledge or treatment of its diseases, the subject is now being appreciated more at its proper value. In the diagnosis of ureteral as well as of kidney disease, the consensus of the opinion of experts is that the cystoscope is of the utmost value.

Wounds of the Ureter in the course of Operations.—Bernasconi and Columbino¹, from experiments on dogs and operations on the cadaver, come to the following conclusions :—

When during an operation the ureter is accidentally wounded, the injury can be remedied by different operative procedures, according to the nature, location, and site of the traumatism. When it is located some centimetres from the bladder, the surgeon can draw out the ureter easily for three or four centimetres, and implant the upper cut end into the bladder. When the injury is located high up in the lumbar or iliac portions of the ureter, two conditions may be present :—

(a) Simple division without loss of substance, or with slight loss of substance. In this case the two ends may be united by anastomosis.

(b) Division of the ureter with loss of substance, making end-to-end anastomosis impossible. In this case the cut ureter can be anastomosed into the other ureter, this being an easier operation than anastomosing the ureter into the bowel.

R. Freund² recommends plantation of the ureter into the abdominal end of the fallopian tube: the latter should then be separated from the uterus and planted at once into the bladder, in cases where extensive resection of the ureter is necessary. It cannot be done in cases of cancer of the uterus, as the tubes must also be removed, but it is practicable in the cases of intraligamentary fibroids, cystonata, or hydatids. If the tube cannot be used, he recommends uretero-ureteral anastomosis.

Ureteritis.—Baumgarten, as the results of experiments on rabbits, shows that inflammation easily travels up the ureter to the kidney if the lumen of the ureter is blocked.

Stricture of the Ureter.—Howard Kelly³ reports a case of stricture of the vesical ureteral orifice. The patient suffered from backache and much pain in the lower abdomen. The appendix was removed and the uterus fixed, without improvement. On examining the

bladder with a speculum, a cyst was seen occupying the position of the right ureter; from the apex clear urine fell steadily. Whilst watching it with a cystoscope, the cyst began to swell until it was as big as the end of the thumb. On further observation, the cyst collapsed to its former size, and this distension and collapse was watched to take place several times. The diagnosis was stricture of the vesical orifice of the ureter. The slit-like opening on the top of the cyst was incised through the ureteral speculum, and about 45 cc. of clear fluid escaped. The patient was discharged well, and speculum examination showed an opening in the bladder wall instead of a slit, situated on the side of the cyst.

Kelly quotes Adrian, who called attention to 52 cases of dilatation occurring in the ureters. The same writer (Kelly) reports a case of stricture of the upper end of the ureter, which he treated by dilatation. The patient had suffered from repeated attacks of pain on the left side, but nothing was found on physical examination or on examination of the urine. The left kidney was exposed, and was found to have a large hydronephritic pelvis of about the same size as the kidney itself. The ureter was contracted at a point 2 cms. below the pelvis. Kelly incised the pelvis of the kidney about 1 cm. above the ureter, and dilated the stricture by means of ureteral bougies up to 5 mms. in diameter. The wound in the pelvis was then closed with fine silk. The patient made a perfect recovery, and is reported as being without pain.

Ureteric Stone.—Newman describes a case of descending ureteric stone in which cystoscopic examination was made a few hours before the stone was passed. The history was of repeated attacks of renal colic, with gravel on several occasions. An X-ray photograph revealed the shadow of a stone corresponding to the position of the union of the lower and middle third of the left ureter. Cystoscopic examination showed that the orifice of the left ureter was considerably dilated and the shape of a melon seed, the margins were very slightly thickened, and on the left lip the line of the mouth was obscured by a trickle of blood escaping from it. The mucous membrane covering the ureter was pigmented and congested. The same evening a stone was passed. An X-ray photograph was taken, and failed to show the shadow seen in the first plate, and a second cystoscopic examination on the next day showed the same appearance as formerly presented, with the addition of two small submucous hæmorrhages. The stone passed was the size of a horse bean, very irregular in shape, and distinctly nodulated.

John Deaver⁴, of Philadelphia, reports 5 cases of stone in the ureter, all operated on by him. He advises in doubtful cases to always explore the kidney through the loin, and to pass a sound down the ureter before concluding the operation. If a stone is found in the ureter, the wound should be enlarged and the calculus extracted by appropriate means. He points out that if, after an attack of renal colic, symptoms of vesical calculus arise, and no calculus is found in

the bladder, the calculus is probably in the lower part of the ureter, and its location may perhaps be detected by rectal palpation or cystoscopic examination. He advises that all cases of impacted calculus should be removed, and gives records of 25 operations for ureteral calculus with only two deaths, one patient having recurrent carcinoma of the ureter. The route to be chosen for the removal of the stone is of much importance; if it be known to be near the bladder, it is usually most successfully removed intravesically. In the female, it has been removed by the vaginal route, and in the male by the perineal route, but these appear to be less satisfactory than the intravesical. In cases which are not close to the vesical orifice of the ureter, an extraperitoneal operation is strongly recommended. Betham Robinson⁵ exposed the ureter extraperitoneally and removed a calculus in a child of three years old. Deaver recommends that incision into the ureter itself is to be avoided, the stone being pushed upwards into the pelvis of the kidney or downwards into the bladder. He thinks the probability of a permanent urinary fistula remaining has been exaggerated. In one of his 5 cases, the patient had a carcinoma in the ureter immediately above the site of impaction.

He quotes Metcalf and Safford⁶ as having been able to find recorded only 7 authentic cases of carcinoma of the ureter.

Gibbon⁷ reports two cases of ureteral calculus in which the stone was removed by combined intra- and extraperitoneal ureterolithotomy.

Calculus Anuria.—In reporting a case of calculous anuria due to a stone impacted in the ureter, Clayton-Greene⁸ makes the following remarks: (1) The patients, according to Morris, are usually fat; (2) Males seem more subject than females; (3) The diagnosis is usually simple; in most published cases an attack of colic has ushered in the anuria; (4) Spontaneous cure, according to Lague, has occurred in 28 per cent of cases, but according to Morris, 20 per cent; (5) Of cases operated upon, 51 per cent recovered; (6) The fifth and sixth days have been taken as a rough guide to the time up to which one may fairly hope for spontaneous cure, but little reliance can be placed on these times; (7) Operation has been successfully performed on the fourteenth day; but on the other hand, death has ensued after an operation on the third day.

In the course of an article on the surgical aspects of anuria, Cumston⁹ states that clinically, three possibilities may exist as far as development of calculous anuria is concerned: (1) Both kidneys in perfect function are arrested in their secretion, from a calculus being lodged first in one ureter, and the same thing occurring in the other shortly afterwards; (2) One kidney useless from previous disease, and the other ureter occluded by a stone; (3) A stone being lodged in one ureter, and the other being absent, either from operation or congenitally. Of the first variety, only one authentic case is on record. The second variety is common; whilst of the third, two cases are reported, one in the article and one by Kammerer¹⁰.

Meyer records a case of anuria 30 days after nephrectomy, due to occlusion of the ureter by clots and pus. Nephrectomy was performed successfully. "The diagnosis of calculous anuria can ordinarily be made from the history of the disease, because the patients generally have been previously treated for urinary symptoms, such as the passage of gravel or calculus. Colicky pains and blood in the urine precede, in many cases, the passage of stone, but on the other hand any symptoms may be lacking."

REFERENCES.—¹*Ann. d. Mal. d. Org. Gen.-Urin.* Sept. 15, 1905; ²*Centr. f. Gyn.* 1905, No. 27; ³*Johns Hop. Hosp. Bull.* June, 1906; ⁴*Ann. Surg.* May, 1906; ⁵*Brit. Med. Jour.* 1905, vol. i, p. 357; ⁶*Amer. Jour. Med. Sci.* 1905, vol. i, p. 50; ⁷*Ann. Surg.* May, 1906; ⁸*Lancet*, Jan. 13, 1906, p. 92; ⁹*Ann. Surg.* July, 1906; ¹⁰*Ibid.*

URETHRA (Diseases of).

E. Hurry Fenwick, F.R.C.S.

Congenital Deformities.—Stinson¹ describes his methods of operating for hypospadias. Several points must be attended to. The curvature of the penis must be remedied; the natural orifice of the urethra must be made of normal size, and a fresh urethra must be made from this orifice to the end of the glans. The satisfactory way of fulfilling these indications is:—

1. To perform an external perineal urethrotomy and insert a large tube into the bladder, thus draining away every drop of urine, so that the plastic operations which are done later will heal primarily.

2. To remedy the incurvation, the urethra is dissected from its surroundings.

3. A new urethra is formed in the glans and body and anastomosed with the dissected-up old urethral orifice.

4. To cover over the raw surfaces on the glans and body, the hood is utilized.

5. Correction of the convexity and the transverse constriction on the anterior or upper surface of the body is done by making an inch-long vertical incision backward in the median line through the skin and subcutaneous tissue. After operation, the patient is to be kept sufficiently under bromides and chloral to control erections.

Churchman² describes a case of congenital strictures of the urethra, one half an inch behind the meatus and the other in the bulbo-membranous urethra, of a boy aged thirteen. Among the symptoms were nausea, vomiting, pain over the urethra, and hæmaturia, and the disease was first thought to be a tuberculosis or calculus of the kidney or ureter. The strictures were gradually dilated by bougies with success.

Rupture of the Urethra in Infants.—Rupture of the urethra, according to Broca³, is in the perineal region. There is bleeding from the urethra, dysuria or even retention, and a swelling in the perineum. Complete ruptures are rare, the superior wall usually remaining intact, and the catheter should be guided along it. A soft, small catheter should be used, and not left in longer than two or three days, otherwise it will become encrusted with salts. If catheterization is impossible,

the swelling in the perineum should be cut down upon, and a catheter passed down to the wound and then up into the bladder. Retrograde catheterization is only necessary if the pelvis is fractured. In cases of traumatic stricture following rupture, excision of the stricture is to be preferred to dilatation with bougies, or internal urethrotomy.

Strictures.—In cicatricial strictures, Selhorst⁴ advocates treatment with the **Electrical Needle** after dilatation. The stricture is dilated up to No. 23 Charrière gauge, or by internal urethrotomy in the case of small, dense strictures. After irrigation of the urethra with oxycyanate of mercury, the urethroscope is passed and the position of the stricture ascertained. A needle connected to the negative pole of the battery is passed into the fibrous tissue of the stricture, the positive pole being placed on the abdomen or thigh. A current of 4 to 6 milliamperes is passed for three minutes, and then the position of the needle is shifted. This is repeated four or five times during the sitting. The sitting is repeated twice a week at first, later once a week. Treatment may have to be continued for months, and during the whole of this period the bougie is introduced once a week. The cure is claimed to be permanent, the fibrous tissue of the stricture disappearing, and the wall of the urethra becoming flexible, limp, and shiny. Previous irrigation of the urethra, and the use of the urethroscope to exactly localize the stricture, are absolutely indispensable. In none of the cases has he had any evil consequences, and during six years he has not met with epididymitis, cystitis, or "bacteriuria." The same author advocates electrolysis of the hypertrophied prostate in a similar manner, but admits that "he has not experimented long enough to feel justified in coming to definite conclusions."

Stones in the Prostatic Urethra.—Morton⁵ records three cases of stone in the prostatic urethra. In all the cases there was a urethral stricture and difficulty in passing water, but in two of the cases there was a complete absence of pain on micturition. The chief symptoms were painless hæmaturia, a dribbling of urine or incontinence, pain in both loins, and pyuria. The prostates in the three cases were so flattened and destroyed that they could not be detected by rectal examination, although the stones could be felt. A point to be remembered in the diagnosis was illustrated in one case: the stone could not be detected by the passage of a catheter into the bladder. Morton states that the stones were not formed in the prostate, and no evidence was forthcoming in two cases that the stones were of renal origin. The third case had an oxalate nucleus, and must have been of renal or vesical origin. He considers that in the other two cases, the stones were probably formed locally in the urethra.

The **TREATMENT** consists of **Perineal Section** to remove the stones, together with **Dilatation** of the stricture, and to prevent accumulation of the stones, the stricture must be kept dilated. This re-accumulation of the stones is one of the difficulties of the treatment of these cases. In one case, 15 stones were again removed two years after the first operation, and more stones afterwards, and in one of the other cases

the patient still frequently passes small stones. Correction of the alkaline condition of the urine by washing out the bladder, and the administration of drugs, such as urotropin or acid sodium phosphate, might diminish the tendency to phosphatic deposit in the urethra, but it is possible that in some of these cases ammoniacal urine may not come from the bladder, but only from the prostatic pouch; if so, a catheter, passed very slowly, would draw off, first the ammoniacal urine, and afterwards urine of a different character, from the bladder.

Thistle⁶ records a case in which the prostatic pouch formed a large swelling in the perineum. The pouch contained three uric acid stones, so they must have been passed into the urethra from the kidney.

New Growth.—A case of primary carcinoma of the male urethra is reported by Shattock⁷, who quotes Kaufmann as to the rarity of the disease, 5 cases only being reported. In Shattock's case the growth was in the anterior $1\frac{1}{2}$ in. of the canal, but in all the other cases the bulbous urethra was affected. All the cases have been squamous-celled carcinoma, although the bulbous urethra is lined with columnar or cubical epithelium. The penis in Shattock's case was amputated by P. A. Lloyd, of Haverfordwest.

H. Webber⁸ records a case of sarcoma of the corpora cavernosa penis. The symptoms were: (1) General enlargement of the penis; (2) Pain and difficulty on micturition; (3) Some slight purulent discharge; (4) Considerable hæmorrhage after the passage of catheter; (5) General discomfort in the organ, and dislike to move it.

The local condition was as follows: "The glans is hard, as though infiltrated with growth. Both corpora cavernosa and corpus spongiosum are involved and are bossy and hard. This condition extends almost to the pubic attachment of the organ. Behind this, the infiltration is more obviously confined to the urethra and surrounding tissues of the corpus spongiosum, extending well into the bulb and seemingly terminating at the triangular ligament. The consistence is of stony hardness; the whole organ is tender, the glands in both groins are enlarged, hard, and suggestive of malignant disease. The case was treated by suprapubic cystotomy and followed by amputation of the penis and both testicles. Recurrence was rapid.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* Dec. 2, 1905; ²*Johns Hop. Hosp. Bull.* quoted in *Brit. Med. Jour.* Nov. 4, 1905; ³*Ann. d. Mal. d. Org. Gen.-Urin.* quoted in *Rev. d. Ther.* Aug. 15, 1906; ⁴*Brit. Med. Jour.* Nov. 25, 1905; ⁵*Ibid.* Aug. 11, 1906; ⁶*Lancet*, 1892, vol. ii. p. 1330; ⁷*Ibid.* April 24, 1906; ⁸*Brit. Med. Jour.* Dec. 16, 1905.

URINES (Coloured).

William Murrell, M.D., F.R.C.P.

Increased attention has been paid of late to the subject of artificially produced coloured urines. They may be blue, green, red, purple, port-wine-colour, or black.

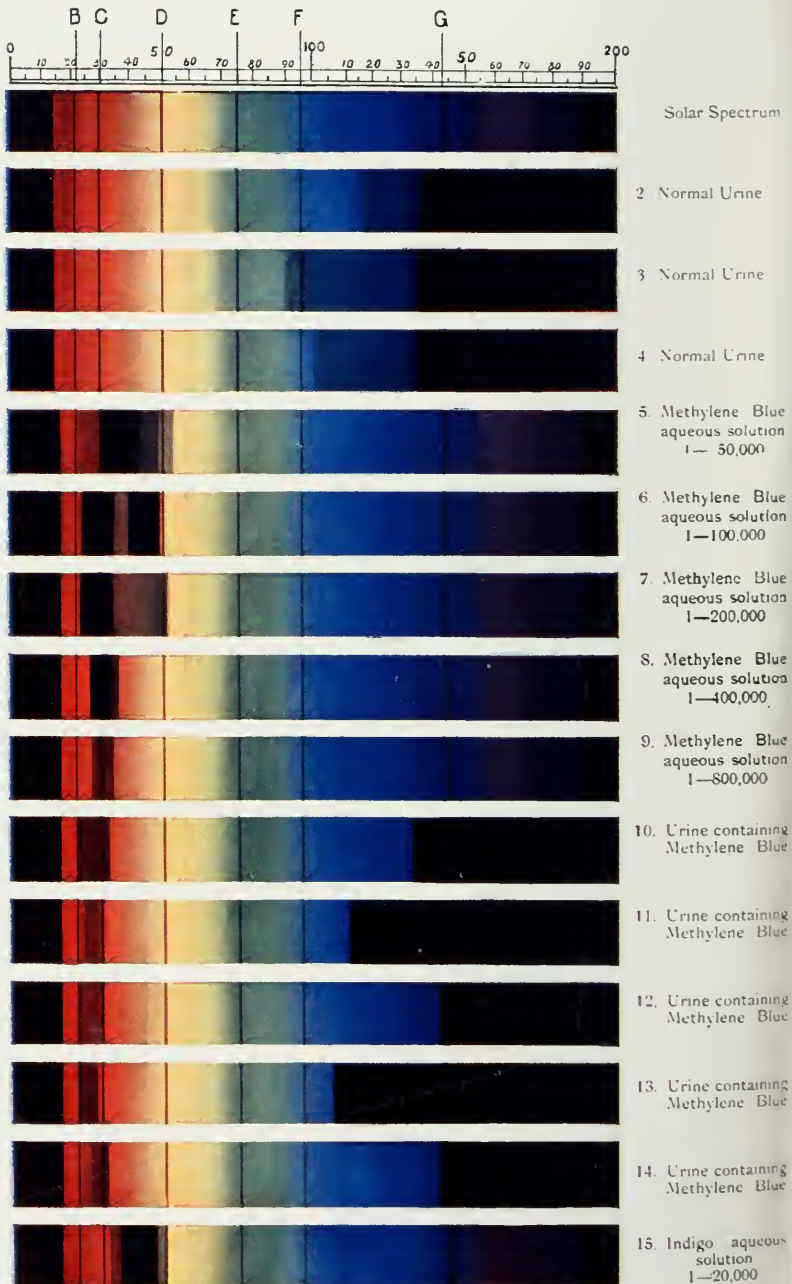
I. BLUE AND GREEN URINES.—Murrell and Wilson Hake¹ have shown that blue and green urines are due to methylene blue or indigo, and in some cases to biliverdin. The great majority of blue urines are methylene-blue urines. Methylene-blue is tetramethylthionine

hydrochlorate. In doses of from 1 to 3 grs. three times a day it is given in cases of chronic nephritis, cystitis, and gonorrhœa, and also in the treatment of patients suffering from bilharzia hæmatobia. It has antiseptic properties, and is said to be useful in the elimination of uric acid. A quarter of a grain twice a day imparts a pea-green colour to the urine, whilst the same dose more frequently repeated turns it a peacock-blue. These urines keep well, undergoing decomposition slowly. After a time, under the influence of bacterial action, they lose their colour, which, however, is speedily restored on shaking, owing to the absorption of oxygen. The addition of a few drops of formic-aldehyde to a methylene-blue urine will prevent decolorization almost indefinitely. Not uncommonly there is a deposit of urates which retains a blue colour after the fluid itself shows no indication of either a green or blue tint. A blue urine which had kept well for weeks, became turbid and lost its colour. A fortnight later it was filtered, and the mere act of filtration at once restored its colour. Two months later, when every trace of the blue had disappeared, withdrawing the cork and shaking vigorously for a few minutes produced at first an olive-green colour, then a sage-green, and finally a well-marked blue. Sometimes the restored blue tint is confined to the upper layer of fluid, gradually merging below into the amber of normal urine. This is the explanation of the multi-coloured urines sometimes seen. A deep blue urine mixed with tincture of iodine is either decolorized, or assumes an olive-green tint. The blue and green colours produced, as above indicated, are not discharged or altered by exposure to X rays for ten minutes, nor by the action for thirty minutes of a powerful Finsen light.

The majority of patients who pass these green and blue urines are not aware that they have taken any drug. In some cases the methylene-blue has been administered surreptitiously as a practical joke, and pink-coated sweets are sold for this very purpose. In other cases the methylene-blue has been introduced into confectionery as a colouring agent: this, however, is probably not common, for in the "Report of the Departmental Committee on the use of Preservatives and Colouring Matters in Foods (1900)," no reference is made to it. A largely advertised remedy for kidney troubles contains this ingredient. Nine-tenths of the blue and green urines are due to the action of this drug. Green urines may be due to biliverdin, easily recognized by its characteristic tests, but they are not common. There is no possibility of confounding methylene-blue urine with carboloria.

The chemical tests for methylene-blue urines are characteristic. The colour is said to be extracted by chloroform, but this reagent only does this partly. It is said, too, that the blue colour disappears, on heating with hydrochloric acid, and reappears, on shaking vigorously in the presence of air, either in the original blue form or as a green; this is not the case, for hydrochloric acid has no effect visibly, even on heating. Nitric acid turns blue urine green. The action of bacteria is the simplest test, although it has no differential value. It

PLATE XXVII.



ABSORPTION-SPECTRA OF COLOURED URINES, ETC.

Murrell and H.

is said that if the colour disappears in a few hours and is restored on shaking, methylene-blue is present, and that in the case of indigo-blue the action takes place much more slowly, in other words, that indigo-blue is more stable. This is not the case, and comparative rapidity is of no value as a test.

The chemical tests for methylene-blue in urine are :—

1. Caustic potash or soda solution produces a violet colour.
2. Nascent hydrogen and other reducing agents decolorize it, the blue reappearing after a short time in contact with the air.
3. Peroxide of hydrogen added to the urine which has lost its colour at once restores the blue. To a specimen of methylene-blue which had been kept in a bottle for many weeks and had lost every trace of colour, a few drops of peroxide of hydrogen were added, and immediately the blue was restored.
4. A dilute solution of permanganate of potassium with sulphuric acid acts in a similar manner.
5. Bleaching powder has the same action.

These tests are reliable, but the most characteristic test is afforded by the spectroscope (*See Plates XXVII, XXVIII, of Coloured Spectra.*)

Methylene-blue is partly excreted with the faeces, which present a bluish tint. When injected subcutaneously it is excreted with the urine. In a man, 17 minims of a 5 per cent solution of methylene-blue were injected into the gluteal region, and in thirty-five minutes the urine had a greenish tint, whilst in sixty-five minutes it was distinctly blue. He continued to pass blue urine for forty-eight hours, after which the colour gradually disappeared. This test has been found useful in patients suffering from various forms of renal disease.

It is not improbable that some of the cases of blue human milk which have been recorded, may be explained in the same way.

Methylene-blue is in mice an antidote for trypanosomiasis or sleeping sickness, and some white mice so treated have bright blue eyes and blue tails, due, not to cyanosis, but to the action of the drug. Dr. Blaxall gave the authors some urine from mice treated in this manner. The urine is of a bright blue colour, and gives the usual tests and spectra. In cases of epilepsy treated with large doses of methylene-blue, the ears, nose, and nails of the patients assume a blue colour, which speedily disappears on discontinuing the drug.

Although the great majority of green and blue urines are due to methylene-blue, they must sometimes be produced by other causes, for cases of blue and green urine were recorded before the discovery of aniline dyes, and the presence of indigo has been suggested as an explanation. Large quantities of indigo may be taken without affecting the colour of the urine. The indigo found in the urine is formed from indoxyl sulphate, a derivative of indol, a product of intestinal digestion. Indican or potassium indoxyl sulphate is present in normal urine, and more abundantly in cases of obstruction of the small intestine and other diseases in which there is increase in the putrefaction of proteids. It may also occur after the administration of certain drugs, such as

creosote, benzoin, aldehyde, or turpentine. It readily splits up on oxidation into indigo-blue and potassium hydrogen sulphate. The indican of urine (sometimes called animal indican) was so named from an erroneous idea that it was identical with vegetable indican; this last is a glucoside, and resembles animal indican only in the fact that indigo-blue is one of its products of decomposition when boiled with acids.

Indigo-blue urines are always alkaline in reaction, and are usually in a state of decomposition. The colour, as in the case of the methylene-blue urines, is discharged after a time by the action of bacteria, and the colour reappears on shaking with air. With nitric acid, indigo-blue is split up into isatin, and the colour cannot be restored by shaking. Sometimes, however, with this reagent, a reddish-brown or ruby-coloured solution results, due to the oxidation of the indigogens normally present in the urine. The colour of the indigo solution is not altered by exposure either to X rays or the Finsen light.

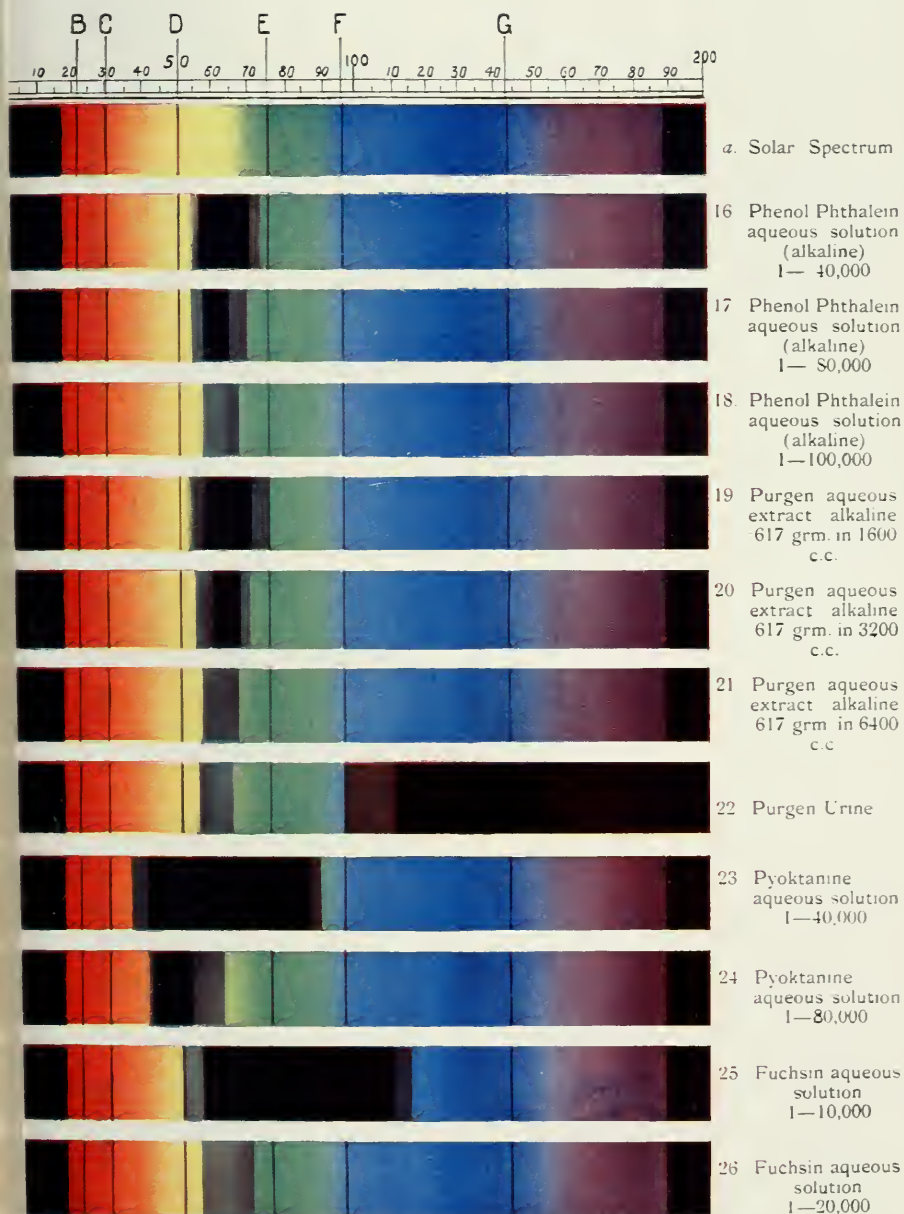
The spectrum of indigo is characteristic, and shows an absorption band in the orange (*See Plate XXVII, Fig. 15*).

Stockman² records two cases of blue or green urine, one of which was due to methylene-blue given as a practical joke, whilst in the other the source was not ascertained, but was probably due to an aniline dye accidentally absorbed. Other cases have been published by Parkes Weber³, Hughes⁴, Morley Fletcher⁵, and Good⁶. Braconnot⁷ described two urines in which the blue matter was in fine particles which did not deposit but could be removed by filtration. Hassal⁸ discovered that this blue matter was indigo, and stated that it was usually deposited in decomposing urines, but that the urine was sometimes voided blue. Garrod⁹, in a child which had sucked cloth dyed with indigo and afterwards passed green urine, found that the colour was due to indigo-blue suspended in fine particles in the yellow urine. Beddard¹⁰ described the chemical reactions of indigo in the urine, and Baumann¹¹ published a paper on the same subject.

II. BLACK URINES are usually examples of either (1) Carboluria, or (2) Melanuria.

1. *Carboluria*.—Carbolic acid urine, when voided, is either dark in colour or becomes dark on exposure to air from the formation of hydroquinone, an oxidation product of phenol. Carbolic acid urines usually have an olive-green colour, but may be smoky. The carbolic acid may be detected by distillation after the addition of sulphuric acid; the distillate gives a purple colour with ferric chloride, and a white precipitate of tribromophenol with bromine water. A patient suffering from an obstinate attack of subacute articular rheumatism was given 30 gr. of salicylic acid every three hours for twenty-four hours, making a total of 240 grs. She suffered from the ordinary symptoms of salicylic acid intoxication, and passed dark-coloured urine. Smoky urines, however, are more commonly due to the admixture of small quantities of blood. Fuchsin in small doses, half to one grain three times a day, may produce an olive-green urine.

PLATE XXVIII.



ABSORPTION-SPECTRA OF COLOURED URINES, ETC.

Murrell and Hake.

2 *Melanuria*.—A *café-au-lait* urine is sometimes passed by patients suffering from melaniasis, especially when there is melanotic sarcoma. Melanotic tumours originate in tissues, the cells of which normally contain pigment, for example, the choroid coat of the eye. Melanuria may occur in malarial cachexia and in melanotic affections of the skin and liver, but it is not always present. It may occur, too, after the ingestion of certain drugs, such as creosote and turpentine. On the addition of nitric acid it becomes black from the conversion of the chromogen of melanin into melanin. Melanin is a sulphur pigment, and contains no iron; it has no characteristic spectrum, is soluble in alcohol, ether, mineral acids, and caustic potash, and is bleached by chlorine. When a strong solution of ferric chloride is added to melanuric urine, there is a greyish-brown precipitate of phosphates and pigment, soluble in excess of ferric chloride.

III. PORT-WINE-COLOURED URINES.—These are due to (1) *Hæmoglobinuria*, or (2) *Hæmatoporphyrinuria*.

1. *Hæmoglobinuria* indicates the occurrence in the urine of hæmoglobin or methæmoglobin resulting from the destruction of red blood corpuscles in the general circulation. It must be distinguished from hæmaturia, in which blood, as such, is found in more or less intimate admixture with the urine. In hæmaturia the urine is smoky or even opaque, and under the microscope blood cells are found in considerable numbers, especially in the sediment. In hæmoglobinuria the urine is clear when passed, but becomes turbid on standing, the colour varying from a light pink to a deep scarlet, and then to brown or black. It is usually strongly acid, and deposits lithates on standing. It contains no blood cells, or they are few in number. Toxic hæmoglobinuria may result from the administration of certain drugs, especially chlorate of potassium, and has been observed in malarial patients taking quinine. A large number of widely different drugs convert oxyhæmoglobin into methæmoglobin.

2. *Hæmatoporphyrinuria*.—Hæmatoporphyrin is iron-free hæmatin or hæmatoidin, and is frequently found in the brain and spleen and other organs after the partial absorption of effusions of blood. It appears in the urine after any unusual disintegration of blood corpuscles by which an excess of hæmoglobin is set free. Hæmatoporphyrinuria is a common symptom of sulphonal and trional poisoning, and is always of grave import, these cases usually terminating fatally. It is possibly due to the gradual absorption of altered blood from the hæmorrhages in the mucous membrane of the stomach and intestines produced by these drugs. The reason why hæmatoporphyrin is produced and not hæmoglobin may be explained on the supposition that hæmolysis takes place more slowly than in those conditions attended with paroxysmal hæmoglobinuria. Against the theory that in sulphonal poisoning the condition of the urine is due to the absorption of altered blood, it is urged that there is no corresponding increase in the excretion of iron, and no diminution in the number of erythrocytes or of the percentage of hæmoglobin. It is not positive, however, that such is the case.

There are several chemical tests which serve to distinguish hæmatoporphyrin in the urine from free hæmoglobin. The most reliable of these is the guaiacum test. Guaiacum affords a characteristic and reliable colour reaction for hæmoglobin and methæmoglobin, but gives no blue colorization with hæmatoporphyrin.

The chief dependence, however, must be placed on spectroscopic examination combined with the simultaneous use of various chemical reagents. Monckton Copeman¹² and MacMunn found that the portwine fluid gave a four- or five-banded absorption spectrum with the chemical spectroscope, practically unchanged by ammonia or sulphide of ammonium, whilst the addition of dilute sulphuric acid changed it to the spectrum of acid hæmatoporphyrin. Wave-length measurements of the absorption bands are given in the paper.

IV. RED AND PURPLE URINES.—Excluding ordinary febrile urines, red urines are commonly due to "purgen," "purgatin," pyoktanin, or fuchsin.

1. "*Purgen*" *Urines*.—The synthetical purgative employed under this name is dihydroxy-phthalo-phenone, familiarly known as phenolphthalein. It belongs to the class of bodies known as phthaleins, derivatives of triphenol-methane. It is not a dye, but is related to certain well-known dyes, such as eosin and fluorescein. The history of its introduction as a therapeutical agent is well known. From its well-marked chemical reactions it was used to earmark certain wines. Consumers were not slow to point out that, although it might be somewhat wanting as a beverage, no objection could be urged against it as a purgative. The dose for an adult is said to be $7\frac{1}{2}$ gr., but we usually give it in doses of from 15 to 20 gr. If administered in these doses in the morning early, it acts promptly, in from two to three hours. It induces copious watery motions, unattended with pain or griping. In a case of obstinate constipation in a girl, aged 19, we gave it in 15-gr. doses every alternate hour for twelve hours, without the production of any inconvenient symptoms. When the urine is acid there is no coloration; when the urine is alkaline or neutral it shows a deep crimson-red colour. The colour is destroyed by acids and restored by alkalis. The spectrum of urine coloured with "purgen" is identical with that of a solution of phenolphthalein, that is, in strong solution, the whole of the spectrum, with the exception of the red and orange, is either very much darkened or completely blotted out, whilst in more dilute solutions a distinct band is seen, mainly in the green.

Tunncliffe¹³ discusses the mode of excretion of this substance. It is excreted partly by the urine and partly with the fæces. When potash or ammonia is added to the motions, the whole mass develops a brilliant purple colour. The diapers of babies taking purgen are coloured pink, a circumstance which sometimes attracts attention. "Laxoin" gives the same reactions as "purgen," and is apparently phenolphthalein.

2. "*Purgatin*" *Urines*.—"Purgatin" is chemically anthrapurpurin diacetate. Its purgative properties, absorbability, and toxic action

in large doses are discussed by Marshall¹¹. The dose as a purgative is from 20 to 25 gr., smaller doses being uncertain in their effect. It colours the urine a bright red both in acid and in alkaline solutions.

"Purgatin" does not lend itself to easy identification by means of spectroscopic observation. In concentrated solutions, part of the orange, yellow, and green are cut off, but on dilution no characteristic band is seen; hence, in urine, it is difficult to identify its presence by this method with any certainty.

3. *Pyoktanin Urines*.—Pyoktanin or methyl-violet is penta- and hexamethyl pararosaniline hydrochlorate, and is said to be an efficient germicide. It has been used in gonorrhœa, cystitis, and some forms of Bright's disease. It shows a well-marked band in the orange and yellow and part of the green (see *Plate XXVIII, Fig. 23 and 24*).

Chemically, pyoktanin may be detected by the following reactions: On addition of hydrochloric acid to the aqueous solution, the colour turns first blue, then green, then deep yellowish-brown, and finally yellow; the reverse change occurs on the subsequent addition of alkali. On addition of concentrated sulphuric acid, a yellow solution, becoming green, blue, and finally violet on dilution with water, is obtained.

In urines containing pyoktanin, which exhibited a faint violet tinge, these were obtained, but not distinctly, owing to the minute quantity of the drug present. When, however, the urine was evaporated to dryness in a water bath, and the residue extracted with alcohol, the alcoholic extract then evaporated, and, taken up with water, a reddish-violet solution was obtained which gave the reactions distinctly. No spectrum could be obtained with any of the pyoktanin urines, owing to the small quantity of the drug present.

4. *Fuchsin Urines*.—Fuchsin or pararosaniline, a derivative of aniline, has been used in cases of albuminuria. In doses of from 1 to 3 gr. it produces a bright purple urine, but in small doses the urine may be olive-green. It shows a characteristic band in the green resembling that of phenolphthalein, practically identical with it in position. It may be distinguished from phenolphthalein by the fact that it is soluble in water and is rendered colourless by the addition of alkali, and turns yellow with acids.

REFERENCES.—¹*Edin. Med. Jour.* June, 1906; ²*Ibid.* Aug. 1902; ³*Lancet*, 1901, vol. ii.; ⁴*Guy's Hosp. Rep.* 1856; ⁵*Trans. Clin. Soc.* 1899, vol. xxxii.; ⁶*Lancet*, 1901, vols. i. and ii.; ⁷*Ann. de Chim.* 1825, vol. xxix.; ⁸*Trans. Roy. Soc.* 1854; ⁹*Trans. Clin. Soc.* 1895, vol. xxviii.; ¹⁰*Guy's Hosp. Rep.* 1902, vol. lvi.; ¹¹*Arch. f. d. Ges. Physiol. Bonn*, 1876, vol. xiii.; ¹²*Trans. Path. Soc.* 1891, vol. xliii.; ¹³*Brit. Med. Jour.* 1902, vol. ii.; ¹⁴*Scot. Med. & Surg. Jour.* 1902, vol. i.

URTICARIA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

The most interesting point in this disease just at present is the etiology, and the following research is instructive in this connection. Erasmus Paramore¹ tested the coagulability of the blood in a number of cases; he used for this Wright's oxalic-acid method. In cases

1, 2, and 6 he succeeded in exalting the coagulability by means of a **Calcium Salt**, and an almost immediate recovery ensued. In case 6, a distinctly papular type, he administered citric acid to diminish the coagulability, and the condition changed from papules into wheals, the whole condition again disappearing on giving calcium. In case 9 he produced papular urticaria by giving oxalic acid. His conclusions are that the coagulability of the blood is at fault, and that in this the excretory power of the kidneys has an important part. In renal insufficiency there are more salts in the blood, and hence less coagulability. Milk, he considers, does well in these conditions because of its lime contents, and probably also because of its diuretic effect.

REFERENCE.—¹*Brit. Jour. Derm.* July and Aug. 1906.

URTICARIA PIGMENTOSA.

Norman Walker, M.D.

Fred. Gardiner, M.D., B.Sc., F.R.C.S.

Wallace Beatty¹ considers the chief characteristics of this disease are: (1) Origin in early infancy; (2) Occurrence of yellow, brown, or buff nodules, and persistent pigmentation; (3) Presence of factitious urticaria, most easily produced at the site of the nodules. His conclusions as regards the microscopical appearances are the same as those of Graham Little², viz., an infiltration of mast cells all round the blood-vessels, sweat ducts, and hair follicles.

The latter writer considers the name is a misnomer, and advances the following reasons. The disease begins earlier in life than is perhaps usual in urticaria; the sex incidence is reversed, urticaria being common in females and urticaria pigmentosa in males. Intestinal disturbances, so frequently the precursors of urticaria, are rarely recorded in this disease; and further, itching is usually quite moderate and often absent. Urticaria is at least modified by treatment; no treatment seems to affect urticaria pigmentosa. Blood examinations showed that there was a definite modification of the red cells, tending to increase their resistance to destructive agents. The salt content is increased, and the lime salts are at least not diminished. These, he considers, clearly separate it from that form of urticaria due to defect of lime salts in the blood. He considers that there is a congenital tendency in these patients to over-production of mast cells, the local accumulations in nodules being probably due to irritation. Possibly, therefore, in his opinion, the disease is allied to blood diseases like hæmophilia, pernicious anæmia, and lymphadenoma.

REFERENCES.—¹*Dub. Jour. Med. Sci.* June, 1906; ²*Brit. Jour. Derm.* Dec. 1905, and Jan. 1906.

UTERUS (Diseases of).

Arthur E. Giles, M.D., B.Sc., F.R.C.S.

Victor Bonney, M.S., M.D., B.Sc., F.R.C.S.

MYOMATA.

The literature bearing on uterine myomata is smaller in amount this year than last. Such additions as have been made concern themselves more with the broader aspect of treatment than with controversial questions of etiology and pathology.

Myomata and Visceral Degenerations.—A. T. Bolt¹ has studied the effect of myomata on the cardiovascular system. He finds that a large proportion of the patients present symptoms of cardiac degeneration, whilst many exhibit a tendency to arteriosclerosis and renal insufficiency. He deduces from this, that these tumours should be removed, and that the visceral changes he describes, rather than being a contra-indication, are a strong argument in favour of operative treatment. It is satisfactory to find American confirmation of the important statements made on this head by Wilson at the London Obstetrical Society in 1904.

Myomata and Pregnancy.—A good deal of attention has been paid to the subject of myomata complicating pregnancy. Frank Taylor² has made a further communication on the subject of the red necrobiosis which affects these tumours, and which appears to be largely conduced to by the super-imposition of pregnancy on a uterus the subject of myomatous growths. Similar evidence has been published by Thring³ and by Doleres and Chartier⁴. There can be no doubt that pregnancy is the common though not the only determining cause of this degeneration. (One of the authors of this article [V. B.] removed a myoma undergoing this form of degeneration, from a virgin aged 27). The leading features appear to be sudden accession of pain, together with rapid increase in size of the tumour. Cases presenting such symptoms and signs should be submitted to operation at once.

Two interesting cases are recorded of torsion of the uterus in pregnancy, due to uterine myomata. Stewart⁵ and Lepage and Mouchotte⁶ are the authors. In each case the accident was due to axial rotation of a pedunculated myoma, growing from the fundus, and the symptoms were very severe. Most extraordinary to relate, in both cases myomectomy was successfully performed, and the patients were successfully delivered of living children at full term.

Myomectomy during Pregnancy.—The operations of **Myomectomy** and **Enucleation** during pregnancy have fallen somewhat into disuse, not only because of their tendency to produce abortion, but because of the difficulty of determining beforehand the suitability of the case for such procedures, and the fact that where enucleation fails, the pregnant uterus must perforce be sacrificed to check the hæmorrhage. Cases such as those referred to above, and particularly an article by Thring³, show that the operation may be successfully performed, even in cases where the tumour is deeply imbedded in the wall of the pregnant uterus. Thring reports no less than six cases of this operation—all the patients recovered, and in only one did abortion occur. Alban Doran⁷ has reported a similar case, and cites 62 cases tabulated by Thumin. There were six deaths in this series; abortion only occurred in 10 instances. Successful cases, have also been reported by Cullingworth and Bland-Sutton.

There can be no doubt, where operative interference is necessitated during pregnancy, that myomectomy or enucleation is the ideal

treatment. The possibility of hysterectomy being forced upon the operator in order to control hæmorrhage after enucleation should be borne in mind, and for this reason operation should, if possible, be postponed until viability is reached. Of course, such an urgent condition as axial rotation must be treated at once, but these are just the cases where myomectomy can be surely and safely performed.

TREATMENT OF MYOMATA.—It is very interesting to note the change in gynæcological opinion as to the appropriate treatment of uterine myomata which the last ten years have brought about. Every year brings an increased disposition to subject these cases to early operative interference. This is probably due to the increasing number of reports of series of cases successfully operated upon. In the hands of experts the mortality in hysterectomy for early uncomplicated cases of myomata is probably not more than 1 per cent. Series of over 100 consecutive cases without a death are now on record. Indeed it may be said that, excepting the accident of pulmonary embolism (1 in 500), the operative mortality in healthy women with uncomplicated tumours is *entirely preventable*. Those who have the opportunity of studying the results of operations for myomata must appreciate the fact that the cases which succumb are (in the hands of those accustomed to this class of surgery) the *neglected* cases—women in whom the long-continued hæmorrhage has induced various visceral degenerations—tumours which have become adherent, have burrowed deeply under the peritoneum, or are complicated by tubal or ovarian disease. It is in such patients that the operation must always have a certain mortality, and it is regrettable to consider in these cases that there was a period in the life history of the tumour when its removal might have been effected with very slight risk.

Alban Doran⁸ has published a study of 60 cases of **Subtotal Hysterectomy** for myomata with special reference to the after-results. He discusses the theory maintained by Abel and Zweifel that conservation of the ovaries is not a guarantee against possible menopausal discomforts, unless a certain proportion of the endometrium be left also, because, without this, atrophy of the ovaries will ensue within three years. His cases, which he has analyzed very minutely and followed carefully as to their after-history, decidedly favour the practice of conservatism as regards the ovaries, and tend also to support the view that the greatest freedom from after-results is attained when a proportion of the corporeal endometrium is conserved also. The writer refers to Crewdson Thomas's article⁹, published in 1902, which conclusively supported conservation of the ovaries in these operations. The propriety of saving, if possible, a portion of the corporeal mucosa when performing hysterectomy has received further support as the result of certain experiments carried out by Bond¹⁰ on the rabbit. The point is one of special interest in view of the advocacy accorded to total hysterectomy, as a routine measure in the treatment of myomata, by Spencer and some other English authorities.

Haultain¹¹ publishes no less than 203 cases dealt with by subtotal hysterectomy, with 2 deaths. A perusal of his paper leaves one strongly impressed with the value of this operation, although we are not disposed to agree with him that 50 out of every 100 myomata are neither to be considered as a menace to life, nor as a barrier to health, happiness, or usefulness. Neither can we follow him in his castigation of those who would remove the (according to him) symptomless half-hundred. We cannot believe that one in every two myomata is discovered accidentally, in the absence of symptoms. No doubt many such cases exist, but as they cause no trouble they are not discovered. These symptomless tumours, in our opinion, do not constitute more than 5 per cent of all the cases of myomata in which the surgeon has to determine the advisability of operative assistance.

Noble¹² has produced an extremely valuable article on the relative value of **Myomectomy** as a cure for this disease. He has performed this operation 94 times, and is therefore entitled to speak upon its results with the weight of high authority. His conclusions are as follows: (1) About 10 per cent of the patients may be subsequently expected to bear children; (2) In about 6 per cent a further development of the tumours will take place; (3) Myomectomy cures the symptoms complained of in about 70 per cent of the cases, hysterectomy in 97 per cent; (4) Myomectomy has a mortality more than one and a half times that of hysterectomy. The principal value, then, of the operation is, as Noble points out, the maintained hope of future conception and the conservation of the endometrium in accordance with the Abel-Zweifel theory. But taking these advantages into consideration, the author quoted holds that the operation has a limited scope. With this conclusion we are in entire agreement.

Myomata and Cancer.—Piquand¹³ has continued his exhaustive researches concerning myomata, with interesting results. He concludes that myomata undoubtedly favour the development of carcinoma of the uterine body, by giving rise to such lesions as chronic endometritis and metritis. Taking 1000 cases of women with myomata, he finds cancer of the body is eight times as frequent in them as in women not so afflicted; this is a statement of the highest importance. As regards cancer of the cervix, he believes that here, too, myomata undoubtedly predispose, though less powerfully. He considers that the frequency with which myomata are complicated by carcinoma indicates removal of every one of these tumours, even when causing few symptoms. The liability to the development of carcinoma is greatest at and about the menopause.

Bland-Sutton¹⁴ has made a succinct contribution to the literature in this connection, and records 8 cases of corporeal carcinoma complicating myomatous disease. His conclusions entirely support Piquand. Winter¹⁵ has arrived at similar conclusions. He has collected 27 cases in which carcinoma attacked the stump left after subtotal hysterectomy. His opinions on this complication are as follows:

(1) In the majority, the growth was present at the time of operation; (2) When it developed later, no connection with the operation was apparent; (3) The value of subtotal hysterectomy is not affected by this accident. With regard to the occurrence of sarcoma in these tumours, his own researches show an incidence of over 4 per cent.

CARCINOMA.

The radical treatment of uterine carcinoma which was initiated by Wertheim, and detailed by him in last year's *Medical Annual*, is steadily gaining ground amongst gynaecological surgeons, and an increasing number of cases are being published by various Continental authorities. One of the most important papers of the year is that of Pollosson¹⁶, who has performed a number of these operations. His mortality in 18 cases of carcinoma of the cervix treated by this method was 18.5 per cent, but his percentage of operability has increased from 14 to 56 per cent. Barsch¹⁷ also discusses the advisability of these extended operations. One third, at least, of all removable cancers of the uterus have already glandular infection. It is obvious that in these cases the vaginal operation is inadequate.

Wilson¹⁸ in an interesting paper, makes a strong plea for the earlier diagnosis of cases of cancer of the uterus. Widespread ignorance amongst the laity is responsible for the greater proportion of hopeless cases, and until women are taught the importance of consulting the doctor when the first symptoms of the disease appear, it is impossible to believe that any very marked improvement in the results of treatment, even by the most modern methods, will be apparent. The almost universal idea at present held by the women of the less educated classes, namely, that increased or continuous loss is to be expected at or about the menopause, is in urgent need of combating. How to best effect this conversion of public opinion is a question that is in pressing need of decision.

Whilst these prophylactic measures should claim the attention first, the question of the value of more radical forms of surgical treatment is also of great importance. A review of the latest experience of those engaged in this form of surgery encourages one to think that, despite the heavy operative mortality, the procedure first advocated by Wertheim has really effected a step forwards in the treatment of this appalling disease—and there can be no doubt that when patients have been taught the importance of applying at once to the doctor, on the appearance of menstrual irregularities, both the immediate and remote results of these extended operations will be greatly improved.

PARAVAGINAL SECTION.

Sinclair¹⁹ has written an interesting article on the operation known as paravaginal section. The object of this procedure is to enlarge the vaginal route to the pelvic organs. This is effected by a deep incision carried from the vaginal introit round the anus

towards the coccyx. This is subsequently extended up the vagina. A large increase of access to the operative site is obtained. It appears to be a good, and at times even the preferable, operation for various forms of new growths of the uterus, amongst which, however, carcinoma of the cervix is not to be included, since the risk of infecting the extensive wound in the paravaginal tissues is obvious.

DISPLACEMENTS.

The most important contribution to this subject during the past year has been made by Herman²⁰. This author, in introducing a discussion on the subject of ventral fixation of the uterus, reviewed the pros and cons of this operation in an impartial manner. He believes that ventral fixation is the best mode of relieving symptoms caused by retroversion or retroflexion of the uterus, when mechanical support is not satisfactory, and that combined with elytrorrhaphy it is an efficient treatment for prolapse. As a treatment for retroflexion he advises it, (1) When the uterine body is very tender, and no pessary will keep it in anteversion; (2) When the displacement is complicated by adhesions; (3) When a pessary, having been worn for some time, fails to afford relief.

Hey Groves²¹ has written an interesting article on the treatment of uterine prolapse and other abnormalities depending upon relaxation of the pelvic diaphragm. He strongly advocates myorrhaphy, i.e., stitching together the divaricated edges of the levatores ani muscles, either behind or (in cases of cystocele) in front of the vagina. The operation undoubtedly is a good one and deserves a trial.

Horrocks²² speaks warmly of the use of pessaries when applied with a due appreciation of their mechanics, and with proper care and supervision. He ventures to think that so far from pessaries becoming things of the past, future generations will make an increasing demand for them. He believes that since this treatment is absolutely free from danger to life, a trial should always be given it where possible before resorting to operative measures.

METRRORRHAGIA MYOPATHICA.

Of late years a good deal of attention has been called to those cases of persistent and most profuse metrorrhagia in elderly women, about the climacteric period. These cases have lately been investigated by Anspach²³ and Simpson²⁴ in America. In this country attention has been called to them by Bland-Sutton, Barbour, and others. The leading feature on microscopical examination is an intense arteriosclerosis following a peri-arteritis. This change bears no relation to the condition of the rest of the vessels of the body. The cause is obscure. A similar fibrosis is found in the uteri of younger women, as the result usually of chronic gonorrhœal infection. These are the cases in which uncontrollable metrorrhagia follows removal of the appendages for suppurative disease. It is possible then that the older patients are also the victims of some chronic infective condition affecting the

uterus. At present further investigation is wanted. In practice the chief interest of these cases lies in the impossibility, either by drugs or the milder operative measures, of checking the hæmorrhage. Hysterectomy, preferably abdominal and subtotal, is indicated in the climacteric cases. Where, however, the condition follows gonorrhœal infection, and is associated with profuse purulent discharge, total extirpation by the vagina should be carried out.

SUPRAPUBIC HYSTEROTOMY.

Wood Russell²⁵ advocates suprapubic hysterotomy for exploratory purposes, chiefly in certain cases of persistent menorrhagia or metrorrhagia, which have defied operations per vaginam. The uterus, having been delivered out of a suprapubic wound, is split in the middle line, and the cavity explored; small polyps are removed, or the endometrium is curetted, and the organ is then repaired again with two rows of catgut sutures.

REFERENCES.—¹*New York Med. Jour. and Philad. Med. Jour.* Oct. 1905; ²*Pract.* June, 1906; ³*Brit. Jour. Obst. and Gyn.* Sept. 1906; ⁴*Bull. et Mém. de la Soc. Anat. de Paris*, April, 1905; ⁵*Brit. Med. Jour.* Mar. 1906; ⁶*Compt. Rend. de la Soc. d'Obst. de Gyn. et de Péd. de Paris*, Jan. 1906; ⁷*Brit. Jour. Obst. and Gyn.* Nov. 1905; ⁸*Lancet*, Nov. 1905; ⁹*Lancet*, Feb. 1902; ¹⁰*Brit. Med. Jour.* July, 1906; ¹¹*Ibid.* 1906; ¹²*New York Med. Jour.* May, 1906; ¹³*Ann. de Gyn. et d'Obst.* July, Aug. Sept. 1905; ¹⁴*Brit. Jour. Obst. and Gyn.* July, 1906; ¹⁵*Zeits. f. Geb. u. Gyn.* 1906; ¹⁶*Ann. de Gyn. et d'Obst.* Aug. 1905; ¹⁷*Arch. f. Gyn.* Bd. lxxv. Hft. 2; ¹⁸*Brit. Med. Jour.* Mar. 1906; ¹⁹*Brit. Jour. Obst. and Gyn.* April, 1906; ²⁰*Ibid.* Jan. 1906; ²¹*Bris. Med.-Chir. Jour.* June, 1906; ²²*Lancet*, June, 1906; ²³*Amer. Jour. of Obst.* Jan. 1906; ²⁴*Ibid.* Nov. 1905; ²⁵*Johns Hop. Hosp. Bull.* May, 1906.

VACCINATION.

E. W. Goodall, M.D.

Paul¹ relates a case, illustrated by a photograph, in which a woman was accidentally vaccinated just below the lower lip. A fortnight previously to the patient's consulting him her infant had been vaccinated successfully. Exactly how the mother had become inoculated was not ascertained. The lesion ran its usual course. Wilson Smith² met with accidental vaccination on the cheek; and Dunlop³ gives two cases, in one of which it occurred on the tongue, and in another on the thumb.

Another case of accidental vaccination, recently reported, is that of the infant son of F. Blockmann⁴, Professor of Zoology at Tübingen. This child, when about nine months old, was the subject of chronic eczema of the face. At this time his elder brother was vaccinated, on October 21st, 1901. Pustules developed in the usual way. On November 3rd the other child began to be ill, and from the 10th to 12th pustules developed on the face, wrists and hands, thighs and abdomen. The whole face was swollen, and the right eye tightly closed. The disease was pronounced to be vaccinia. Panophthalmitis followed, with loss of the eye. A woman who washed the bandages used on the child, developed two pustules on the wrist, which also were diagnosed as vaccinia. In consequence of this Prof. Blockmann investigated the subject, and the results of his investigations were published in a book.

It is instructive to know that of 140 cases of vaccinal infection which he collected from medical literature of the twenty-four years 1880 to 1903, in 61 the eyes were seriously involved, and in 9 of these the result was severe disturbance, or complete loss of vision. It is necessary that every precaution should be used to preserve those who are the subject of recent vaccination lesions (vesicles, pustules, etc.), from accidentally infecting other persons.

REFERENCES.—¹*Lancet*, Feb. 3, 1906; ²*Ibid.* Feb. 24, 1906; ³*Ibid.*; ⁴Blockmann's book is reviewed by Dock in *New York Med. Jour.* Jan. 6, 1906.

VARICELLA.

E. W. Goodall, M.D.

This disease is rarely fatal; but that it may be so is shown by the following case, which was admitted to the City Hospital, Liverpool, under the care of Rundle¹, on April 22nd, 1906. The patient was a boy, two years of age. The disease commenced with the eruption on April 20th; on admission there was a fairly copious varicella eruption. In addition there were many petechiæ and ecchymoses on the trunk, shoulders, thighs, and legs; the vesicles and pustules contained a sanious fluid, and there was hæmorrhagic infiltration of their bases. The child did not seem to be very ill. The cutaneous hæmorrhages continued to appear in large numbers. The only hæmorrhages, other than cutaneous, were from the lips and gums, and beneath the ocular conjunctiva of the right eye. Restlessness, delirium, and cardiac failure supervened, and death occurred on April 24th. Hæmorrhagic small-pox was excluded by the distribution, course, and character of the vesicular eruption, and the history of the illness. Nor were the hæmorrhages of the nature of those seen in variola. The child had been successfully vaccinated in three places eighteen months previously.

Anthony, of Chicago, reports 2 cases in which a prodromal rash appeared before the vesicles came out. The rash was a bright red, not punctate, erythema; in 1 case on the trunk only, in the other all over the skin. In each case the eyes were very watery. The temperature was raised, but fell before the vesicles appeared.

A case of cellulitis and sloughing of the right arm, complicating varicella in a child of nine months, and ending fatally, is recorded by Kreuzeder².

Two cases of this disease in which the eruption became confluent have been reported during the past year by Neech³ and Rolleston⁴. In the former's case, a girl of four, the eruption was profuse, the confluence being most marked on the trunk and thighs, where many of the vesicles were umbilicated, and many subsequently underwent pustulation. In the other case, there was considerable resemblance to small-pox. The patient was a boy, five years of age, who was convalescent from an attack of scarlet fever. The attack of varicella began in the usual way, without any prodromal period. By the fourth day the eruption was very copious, there being upwards of 2,000 pocks. The vesicles were confluent on the lower part of the back and on the limbs. The face and limbs were œdematous, especially the fingers. Several of the pocks were multilocular, and some were distinctly

umbilicated. There were a few intravesicular hæmorrhages. Most of the vesicles on the extremities became pustular. There was copious exfoliation of the scabs, and fœtor. During the suppurative stage, some ten days in duration, there were irregular pyrexia (secondary fever). The separation of many of the scabs left punched-out ulcers.

REFERENCES.—¹*Lancet*, June 16, 1906, p. 1642; ²*Munch. med. Woch.* July 3, 1906; ³*Lancet*, Feb. 24, 1906, p. 515; ⁴*Brit. Jour. Child. Dis.* Jan. 1906.

VARICOCELE.

Priestley Leech, M.D., F.R.C.S.

Corner and Nitch¹ report on the results of the **High Operation** for varicocele in 100 cases. After exposure of the cord, the pampiniform plexus was isolated, ligatured in two places about two inches apart, and the intervening portion excised. In some cases the two ends were approximated by a suture; in other cases this detail was omitted. It is better to omit bringing the two ends together in candidates for the services, as if the two ends are brought together a continuous cord results, and they may be told that the operation is a failure.

The Immediate Complications are: 1. Hæmorrhage, which may form a hæmatoma, leading to œdema and thickening of the scrotum, subjacent tissues, and testis. In rare instances the ligature may slip. In two cases, blood which had escaped from the spermatic artery was found in the pelvis; the authors believe this is due, not to a wound of the peritoneum, but to pressure of the blood in the inguinal canal causing a rent in the peritoneum. The warning for hæmorrhage is pain, and the scrotum should always be examined.

2. Orchitis. Inflammation of the testis was noted in 5·6 per cent of the cases; in no case was suppurative orchitis recorded. If the collateral circulation becomes well established, the testis returns to its normal size; if not, the testis and scrotum become permanently thickened.

3. Œdema and thickening of the scrotum, enlargement of the testis, and hydrocele.

4. Suppuration. This is rare, and was noticed in only 4 per cent of the cases at St. Thomas's Hospital.

The Remote Results: 1. The Testis. More or less marked fibrosis of the testis was noticed in 84 per cent of the cases examined. They think this figure is too low, as in eight cases examined a tense hydrocele prevented examination of the testis; probably in 90 per cent there is some fibrosis. In cases examined before operation, the testis was found to be the seat of fibrotic thickening when the varicocele was large and had been present for many years. It may be thus assumed that the changes which result from a varicocele of long duration are produced more rapidly and in greater degree by ligation of the veins.

2. The Epididymis. When the operation has been followed by signs of gross venous obstruction, the epididymis is usually larger, harder, and more easily felt.

3. Size of Testis. It is well known that the testis associated with a varicocele is smaller than that of the other side. Examination after operation showed that in 55 per cent of cases operated on, the

testis was distinctly, and often greatly, larger; this increase in size is invariably associated with hardness and loss of elasticity, and is probably due to a new formation of fibrous tissue; and it is probable that the procreative value of the testis is diminished.

4. Hydrocele as a result of post-operative venous congestion. It makes its appearance very shortly after operation, and in some cases within the first week. It will cause the patient to be refused for the services unless an operation be undergone for its removal. In some cases the hydrocele appears late, even two and a half years after the operation.

5. Spermatocele was noticed in two cases.

6. Hernia. Inguinal hernia was seen in 2 per cent of the cases. It would seem better to suture the inguinal canal when operating on large varicoceles.

7. Recurrence. In 2 per cent some recurrence of the varicocele was noted, but there was no pain nor discomfort therefrom.

8. Thickening of Vas, Sensation and General Results. In 8 per cent the vas deferens seemed to be thickened, and it is probable it was the same in more cases, but it escaped observation; 17 complained of pain in the testis, and 6 of pain in the scar. Twenty-six reported themselves as neither better nor worse for the operation; 4 stated they were worse for the operation, and 70 said they were much improved.

Schifone² says **Durante's Operation** for varicocele is efficient and without danger. The enlarged veins are exposed, and a catgut ligature passed under some of the veins and tied. The ligature is then passed and repassed among the veins, drawn tight, and tied; the least affected veins are left out of the suture, and the veins become suspended just below the inguinal ring.

In a leading article and correspondence in the *Lancet*³ the question of operation for varicocele was discussed, and the balance of opinion was much against operation in these cases, and that there is no good reason for refusing to admit a candidate into the services simply because he has a varicocele.

REFERENCES.—¹*Brit. Med. Jour.* Jan. 27, 1906, p. 191; ²*Il Policl.* Nov. 1905; ³*Lancet*, Dec. 16, 1905, p. 1786 *et ante*.

VARIOLA.

E. W. Goodall, M.D.

PATHOLOGY.—In last year's *Medical Annual* a brief reference was made to the recent work by American observers on the protozoan organisms to which the names of *Cytoryctes vacciniæ* and *C. variolæ* were given by Guarnieri in 1892. We propose to give a fuller account of these organisms and of some results of experiments on monkeys, our sources of information being the papers mentioned in the references at the end of this article.

Cytoryctes variolæ belongs to the class Sporozoa. As sporozoa have never yet been cultivated on artificial media, it has not been possible to carry out the rigid tests that can be applied in the case of many of the bacteria. Our knowledge is derived from a microscopic study of specially stained sections of the eruption of small-pox in different stages, whether occurring naturally in man, or as a result of the

inoculation of monkeys, and of similar sections of the lesions produced by inoculating small-pox virus and vaccine lymph into the corneæ of rabbits. Calkins points out that the study is a difficult one, requiring a considerable acquaintance with these forms of life. The material for observation must be fresh; great care has to be exercised in order not to mistake artefacts and products of degeneration for protozoa. The complete life history of no species of the order microsporidia (to which cytocytes belongs) is yet known. Calkins states that in the sections he has examined the stages of growth of the organisms are always present in sequence, "a sequence which follows *pari passu* with the development of the skin lesions." This is a most important fact in the interpretation of the microscopic appearances, which are found only in association with the lesions of vaccinia and small-pox, natural or inoculated.

The appearances may be briefly described as follows: When *vaccine lymph* is inoculated into a rabbit's cornea, after a few hours minute bodies, round or irregular in shape, are found in the epithelial cells, but not in the nuclei of the cells. These bodies, very minute ($1\ \mu$) at first, increase to form amœba-like bodies (cytoplasmic form of the parasite), 10 to 12 μ in diameter. As they grow, a number of small round bodies (gemmules) form within them, similar to the minute bodies from which they (the cytoplasmic forms) arose. The cytoplasmic form disintegrates and sets free the gemmules, which penetrate neighbouring epithelial cells and give rise in them to new cytoplasmic forms. Similar bodies with a similar development are found in the *vaccine* lesions of the skin, cornea, and mucous membranes of the calf, of the skin and mucous membranes of the monkey, and of the skin of man; and also when *variola* is used to inoculate the cornea of the rabbit.

But in the pocks of *small-pox*, whether natural in man or inoculated in monkeys, a further development of the parasite is observed. The gemmules penetrate not only neighbouring cells but also the nucleus of the cell in which they have developed. What exactly takes place in the cell-nuclei is not yet clearly known, but it is believed that a male and female body (gametocytes) are formed, which conjugate to become a single body (zygote). The zygote contains a central nucleus-like mass, which breaks up into minute fragments and becomes distributed through the body of the zygote. These fragments grow to form spore-forming bodies (primary sporoblasts), and the collection of sporoblasts in the zygote is called the pansporoblast. By the disintegration of the nucleus the pansporoblast is set free; and it may escape from the body of the cell. The pansporoblast is 10 to 12 μ in size, and contains 8 to 20 primary sporoblasts. The sporoblasts are set free by the disintegration of the pansporoblast. In the sporoblasts spores develop. These spores are very minute ($\frac{1}{2}\ \mu$). Apparently these spores, liberated from the primary sporoblast, migrate, either by pushing in some way or other through the tissues, or by being carried by the blood. Apparently the spores may develop into secondary sporoblasts in the nuclei of epithelial cells.

It is believed that the spores, cast off from the skin in the pus and

débris from the pustules of the eruption, are conveyed to susceptible persons, in whom they give rise to an attack of small-pox. How they get into the blood and tissues of the infected individual is not known. It is surmised that a primary lesion (protopustule) is caused at some point in the respiratory tract; in this lesion the spores develop into parasites, from which fresh spores are produced. These spores are carried by the blood-stream as emboli to the skin, where they develop into amœboid parasites and cause the eruption. But though careful search for this assumed protopustule was made in 52 autopsies in the Boston epidemic of small-pox, 1901-1902, it was in no case found.

It will be noticed, from what has been stated above, that the parasite of vaccination reproduces asexually in the body of the epithelial cell, while that of small-pox not only does the same but also probably has a sexual reproduction in the nucleus of the cell. According to the account given by Calkins, the spores resulting from the (probable) sexual reproduction are smaller than the gemmules from the asexual reproduction. We know that the infective agent of small-pox, whatever its nature may be, can be conveyed very easily from the sick to the healthy, certainly by third persons and infected articles, very probably also through the air; whereas the infective agent of vaccinia is not conveyed in these ways, but has to be inoculated into the skin or mucous membrane in order to produce the characteristic lesion. If the interpretation of the appearances briefly described above is correct, the spores are the infective agents in the case of small-pox, the gemmules in the case of vaccinia; so that the former are more easily conveyed than the latter. But both spores and gemmules are very small, and have no characteristic staining reaction by which they can be demonstrated in the contents of the vesicles and pustules of vaccinia and small-pox, in which lesion the infective agents certainly exist.

But, while the infective agent of variola can be more readily conveyed than that of vaccinia, it is curious to note that, so far as the experimental evidence goes, vaccine virus, when dried and exposed to room-temperature in the Manila experiments, retained its activity longer than did variola virus. The series of experiments was not sufficiently extensive to give conclusions that could be accepted as final.

The experiments conducted with the view of ascertaining the degree of immunity produced by the two viruses gave inexplicable results. Immunity produced by vaccine virus against both vaccinia and inoculated small-pox was stronger than that produced by inoculated small-pox. It was further demonstrated that vaccinia has a greater infective power than variola. Immunity against inoculated small-pox could be produced while susceptibility to vaccine virus still remained.

[Compare these results with the observations of Hibbert and Robinson, mentioned in the last volume of the *Annual*. They found that vaccinia could be produced in some persons who already showed the eruption of small-pox.

It is believed nowadays, as indeed it was believed by Jenner, that natural small-pox, inoculated small-pox, and vaccinia are modifications

of the same morbid process. In inoculated small-pox we have an initial local lesion, followed, after an incubation period of eight or nine days, by a generalized eruption. In natural small-pox we have a longer incubation period after exposure—twelve or thirteen days—no local initial lesion that has been discovered so far, and a generalized eruption. In vaccinia there is the local initial lesion, without any subsequent generalized eruption. But these three modifications may be carried further. Thus, there may be no generalized eruption in either natural or inoculated small-pox; while in some rare cases of vaccinia, a generalized eruption has been observed. It has long been known that if small-pox virus is inoculated into the skin of a calf, vaccinia is produced. The vaccinia may be passed on by inoculation from one calf to another through many animals; and if, at the end of the series, the lymph from the vaccination vesicle be used to vaccinate a non-immune human infant, the result is not small-pox, but vaccinia. But in one of the American experiments, Tyzzer produced inoculated small-pox in a monkey, with lymph which had passed through five generations in the cornea of rabbits (in which animals the local lesion only had been produced), the virus having been originally obtained from a case of inoculated small-pox in a monkey.—E. W. G.]

The American experimenters found that monkeys were susceptible to inoculated small-pox, but they could not get the animals to catch the disease in the ordinary way. Monkeys were exposed to the disease in wards where small-pox was being treated, infected material was placed in their cages, and non-infected monkeys were kept in the same cages with monkeys who were affected with inoculated small-pox; yet the non-infected animals did not catch the disease. But Councilman quotes two writers, Andrew Anderson (1846), and Furlong (1858), who state that monkeys died of naturally acquired small-pox when that disease was epidemic in Central America and Trinidad. The incubation period of inoculated small-pox in the common monkey of the Philippines, the *Macacus cynomologus*, was found by the American observers to be six to eight days, rather less than it was in the inoculated small-pox of man. The eruption affects chiefly the face, wrists, scrotum and anal region, palms and soles, and the inner aspect of arms and thighs, in the order given. The eruption avoided the trunk and outer hairy surfaces of the limbs.

In natural human small-pox leucocytes play a very small, if any, part in the local lesions. There is also a marked diminution of neutrophile leucocytes in the blood. But in inoculated small-pox in the monkey, numbers of leucocytes can be found in the local lesions, and there is an active leucocyte formation in the blood-forming organs.

Bacteria do not take any part in the production of small-pox. Their presence in the skin lesions is by no means constant; indeed they may be absent. But they obtain a hold later, and appear to be important agents in the production of certain complications.

CLINICAL HISTORY.—Bancroft made a careful clinical study of about 1,200 cases of small-pox treated in the Boston Detention Hospital

during the epidemic of 1902-3. In his account of the eruption he states that while it is in the earliest, macular stage, a capillary pulse may be observed in it, especially after slight pressure. The pulse may be seen even in the vesicular stage.

He makes the following statement with regard to the conversion of the macule and papule into a vesicle: "The macule is not of uniform colour, but may be divided into an inner area of hyperæmia, surrounded by a zone of greyish colour, beyond which is a second zone of hyperæmia. The middle grey zone contains fluid within the epidermis, confined in spaces and not removable by a single prick of a needle." With the evolution of the lesion, there appears at the middle of the central red area a small grey spot, which gradually becomes filled with fluid. The grey, vesicular zone increases in size, rising above the level of the inner part of the lesion, and forming a crater or umbilication. It later becomes connected with the grey area at the centre by radial channels traversing the intervening red zone, which, for a time, shows disconnected remnants, but finally vanishes. The pock has now become a tense, hemispherical elevation, either umbilicated or rounded, containing grey, transparent fluid and surrounded by a red areola."

With respect to the initial fever, he states that its character "is of some value in prognosis. The earlier the temperature reaches its maximum the lighter is likely to be the form of the disease. Persistence of the fever throughout the period of the initial stage forecasts a severe form of the disease, while its early subsidence means the contrary." Amongst his cases he found that inflammation of the salivary glands was frequent, occurring usually during the third week. The parotid was most often affected. If there was no suppuration, there was a profuse secretion of saliva. But suppuration of the parotid often took place, and sometimes led to a fatal result.

REFERENCES.—Papers by G. N. Calkins, W. T. Councilman, and I. R. Bancroft, *Jour. of Med. Research*, Boston, U.S.A., 1903 and 1904, reprinted by New Sydenham Society, 1906; Councilman, *Amer. Med.* Oct. 21, 1905.

VOLKMANN'S CONTRACTURE.

Priestley Leech, M.D., F.R.C.S.

C. A. Morton¹ reports a case of this disease in a boy ten years of age, following fracture of the ulna and radius. Resection of a portion of both bones of the forearm was done, with great improvement in the use of the limb.

R. P. Rowlands² performed the same operation in a little girl aged six. In this case also, the contraction followed a fracture. The one great cause is tight splinting, and it is noteworthy that an anterior splint is more dangerous than a posterior one, that an anterior angular splint is very dangerous, and an external is much safer than an internal angular splint. A plaster splint that completely encircles the limb, or that exerts pressure on the front of the forearm, should be avoided; the child should be seen and examined once daily, for several days. The advantages of excising portions of the bones in place of tendon lengthening are: it is easier and takes up much less time; the radius can be drilled and sutured

in such a manner as to correct the crippling limitation of supination of the hand which is practically always present; there is no interference with, and therefore no risk of non-union or weakness of, tendons; if any contracture of the flexors of the wrist be present, this is also corrected at the same time; no nerves are liable to injury during the operation. The only drawback is that the bones may fail to unite. Massage and voluntary movements must be used after operation. Rowlands knows of four cases (unpublished) which have been treated by resection with excellent results.

A. Hugh Ferguson³ reports two cases treated by dissecting out and lengthening the tendons. In one case he introduced sterilized olive oil among the tendons after they had been dissected out, to prevent adhesions forming. He thinks this latter procedure was very useful, but the final results were only moderate.

REFERENCES.—¹*Lancet*, May 15, 1906; ²*Ibid.* Oct. 21, 1905; ³*Ann. Surg.* April, 1906.

WHITLOW (Bier's Treatment). (See INFLAMMATION.)

WHOOPIING COUGH. (See PERTUSSIS.)

YAWS.

J. W. W. Stephens, M.D.

A. Castellani¹ describes the following spirochætes which he has found in scrapings from the eruption of Yaws: (1) a thick spirochæte morphologically identical with *S. refringens* (Schaudinn); this is distinguished from *S. pallida* of syphilis by its greater refractive power, its greater thickness, and by the scanty number of undulations (3-6). (2) A thin delicate form with blunt ends, the undulations being variable (*S. tenuis obtusa*). (3) A thin delicate form, but tapering at the ends (*S. tenuis acuminata*). These forms are found in ulcerated lesions. In non-ulcerated lesions a form occurs believed to be identical with *T. pallidum* (of syphilis). It is extremely delicate, thin and tapering at the ends, 18-20 μ long. Undulations are numerous, uniform, and small. This is termed *S. pertenuis*. (NOTE.—In consequence of the fact that the syphilis spirochæte appears to have no undulating membrane, and possesses a flagellum at each end, it and those resembling it have been put in a separate genus, viz., *Treponema*, so that the syphilis "spirochæte" is now called *Treponema pallidum*). (See SYPHILIS).

Castellani discusses the question of the identity of yaws and syphilis. Distribution: Ceylon, Java, West Indies, West Africa, etc., but extremely rare in India, where syphilis is common. It is disappearing in British Guiana, while syphilis is still rampant (Daniels).

SYMPTOMS.—The "primary sore" the author has not seen, but from native accounts has no doubt of its existence. The natives describe a fungoid growth which is the "mother yaw." Before the typical eruption, furfuraceous, whitish, pruriginous patches appear on trunk and limbs; the typical eruption appears on these parts or on normal skin. The eruption consists of flat papules, which are soon covered with a yellowish brown crust of dried secretion. Beneath this are fungoid granulations. They last 3-6 months in children, and 6-12 months in adults.

Blood Examination.—There is an increase in the large mononuclear eucocytes, 20–34 per cent.

TREATMENT.—**Potassium Iodide** in *large doses* is much more effective than mercury.

Gimlette², in a paper too long for analysis, comes to the conclusion that "*Puru*" of the Malays is identical with yaws.

Montel advises removal of crusts, and application of **Tincture of Iodine**, and **Potassium Iodide** internally, in increasing doses.

Von dem Borne³, for the detection of spirochætes, recommends the taking of the serum of a fresh papule in order to avoid contamination with bacilli and *S. rejringsens*. He found *Treponema (spirochæta) pertenue* (Castellani) in 9 out of 11 cases staining with one of the Romanowsky stains.

Neisser, Baermann, and Halberstädter⁴ have succeeded in inoculating apes with yaws. The infection can be transmitted from ape to ape, and apes infected with syphilis are still susceptible to yaws.

*Rhino-pharyngitis mutilans*⁵ appears to exist, according to J. F. Leys, only in some of the Polynesian Islands. It is said to be common in the Carolines. It begins as an ulcer on the back of the pharynx, the process then extending up the throat into the posterior nares, destroying the bones of the palate, and nasal septum. The disease then stops, the ulcers healing; the nasal cartilage and skin have now fallen in, and the nose and mouth form one cavity. The author considers that leprosy, syphilis (hereditary or acquired), tuberculosis, and yaws can be excluded as causative agents. The disease is very prevalent in Guam (1 per cent) in the Marianne Isles. It occurs also in Fiji, and Dominica in the West Indies.

C. W. Branch⁶ considers that this is not a special disease, but a manifestation of syphilis.

REFERENCES.—¹*Jour. Trop. Med.* Jan. 1906; ²*Ibid.*; ³*Arch. f. Schiffs u. Trop. Hyg.* Sept. 1906; ⁴*Münch. med. Woch.* 1906, No. 28; ⁵*Jour. Trop. Med.* Feb. 1906; ⁶*Ibid.* May, 1906.

YELLOW FEVER.

J. W. W. Stephens, M.D.

It may be useful for scientific workers and sanitary officers to summarize here some of the most important facts established up to the present with regard to *Stegomyia fasciata* and its relationship to yellow fever.

1. In order to transmit infection, the stegomyia must have sucked the blood of a patient during the first three days of the fever, not earlier (during the incubation period, which may be as much as 13 days, but is generally 4 to 6), and not later.

2. The infection is transmitted after an incubation period in the mosquito of not less than 12 days.

3. According to Marchoux and Simond¹, hereditary transmission is possible; thus they state that they once succeeded in transmitting the infection by means of a mosquito raised from the egg of a mosquito previously infected. Rosenau and Goldberger² have been unable to confirm this. In this case it would appear as if the transmission

only occurred 12 days after the mosquitoes had first ingested virulent blood, and also that the mosquitoes hatched from the eggs were only infective 14 days after they reached the winged state, and only after having had one feed of blood previously.

4. *Stegomyia fasciata* is still infective 57 days after sucking blood. The young insects begin to bite 24-36 hours after fecundation. They then bite freely in the day-time. After 3-4 days they become nocturnal in their habits, though Otto and Neumann³ doubt this. In captivity also, if fasting, they can be made to bite in the day. This period of diurnal activity may extend to a week. The time of night during which the insects bite most is from 5 p.m. to 2 a.m. Contagion takes place between the hours of 5.30 p.m. and 7 a.m. The longest period that mosquitoes have been kept alive in captivity is 106 days for the female, and 50 days for the male. *Stegomyia fasciata* lays eggs only after it has sucked blood. Egg-laying takes place chiefly on the 4th-7th day of life. Several batches of eggs are laid, but the mosquitoes do not die after the first laying, for if they did so at about the 8th day of life they could not carry infection, as the incubation period in the mosquito takes at least 12 days. The various stages in the life story of the insect are, at 27° C. (1) Blood-sucking to egg-laying, 3-4 days; (2) Egg to larva, 3-4 days; (3) Larva to pupa, 7-9 days; (4) Pupa to imago, 3-4 days, making a total of 16-21 days.

M. Schüller⁴ describes a bewildering variety of structures in films of yellow-fever blood. Some of these appear to be distorted corpuscles, others are interpreted as parasitic forms, spores, microgametes, sporozoites, spermatozoa-like bodies, and also spirochaetes.

J. Guiteras⁵ emphasizes the danger arising from mild unrecognized cases of yellow fever in young children and young adults of the native population.

DIAGNOSIS.—(1) In yellow fever the percentage of hæmoglobin is high during the first few days: rarely below 90° C., often 100° C., or even above. In influenza, malaria, and typhoid, it is low: 80-70. (2) The diazo-reaction of Ehrlich is *not* present in uncomplicated cases of yellow fever. (3) The special feature of the urine in yellow fever is that the albuminuria is out of all proportion to the other symptoms present.

G. Sanarelli⁶ still believes that his *B. icteroides* is the cause of yellow fever, and disbelieves in the stegomyia view. He objects that in infection experiments no controls were made with stegomyias that had fed on other patients suffering from other diseases, and that no second transmission from an alleged infected patient (by stegomyia) to healthy patients was attempted. He also points out that Santos, in Brazil, although no mosquito destruction was carried out, became free from yellow fever in the same year as Havana, where a vigorous campaign took place to which the disappearance of yellow fever has generally been attributed.

REFERENCES.—¹*Ann. de l'Inst. Past.* Jan. 1906; ²*Abst. in Brit. Med. Jour.* May, 1906; ³*Zeits. f. Hyg. u. Inf. Krankh.* 1905, p. 359; ⁴*Berl. klin. Woch.* Feb. 12, 1906; ⁵*Med. Rec.* Nov. 1905; ⁶*Rev. Hyg. et de Police Sanitaire*, 1906, No. 5.

Part III.—Miscellaneous.

SANITARY SCIENCE, 1906.

By JOSEPH PRIESTLEY, B.A., M.D., D.P.H.,

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"CARRIER" CASES OF DIPHTHERIA.

Prominence has been given during the year to the importance of what are known as "carrier" cases of diphtheria, i.e., persons having the Klebs-Loeffler bacilli of diphtheria present in their throats or noses (or both), and yet having, apparently, no clinical symptoms of diphtheria. By means of such persons the disease can be transferred to others, and this fact becomes an important consideration in the case of children attending schools. Strict isolation becomes absolutely necessary.

It is acknowledged by all experts that diphtheria, like other infectious diseases, occurs clinically in varying degrees of severity—from the very slightest (if any) departure from normal health, with no characteristic local lesion, to the well-known typical manifestation and symptoms of the disease in its acute severest form, with or without characteristic local lesion. It is only very rarely that the true Klebs-Loeffler diphtheria bacilli may be found in the throat or nose of a person in normal health, and *who has not been in contact with diphtheria*. The case is different, however, when diphtheria is about. Persons, apparently in normal health, may carry the diphtheria germs in their throats and noses, and may, in this way, be the direct means of spreading the disease, without themselves suffering in any way. This infectivity of "carrier" cases is one of the most troublesome things to deal with—more especially in children, who are always more or less susceptible, when aggregated together in schools. The safest line of action is to strictly isolate, etc., not only all patients who show in their throats or noses (or both) "true" or "real" diphtheria bacilli, but also all contacts, or suspects, who show, on bacteriological examination, in their throats or noses (or both), "doubtful" or "suspicious" diphtheria bacilli, during the prevalence of a genuine diphtheria outbreak or epidemic.

Clinical diphtheria as it is sometimes seen (e.g., high temperature, swollen throat, discharging nose, the presence of membrane, etc.) can be readily diagnosed by a mere tyro in medicine, but "carrier" or "latent" diphtheria (e.g., with few, if any, clinical symptoms, but with simply the diphtheria bacilli in the throat or nose, or both) can only be diagnosed by bacteriological examination. Between these two types, there are many intermediate gradations.

Official recognition of the importance of bacteriological examinations has recently been given by the Education Department of the London

County Council, who have decided that, when diphtheria is about and children have been kept from school on account of attacks of diphtheria or sore throat, such children shall not be allowed to return to school without a medical certificate, *based on bacteriological examination*, to the effect that they are free from infection. Systematic bacteriological examinations of the throats and noses (nasal diphtheria being commoner than is generally supposed) will become necessary, and a corresponding larger amount of work will be thrown upon the Sanitary Authority. The decision of the London County Council might, with advantage, be followed by other Educational Authorities throughout the country.

COMPULSORY NOTIFICATION OF PHTHISIS PULMONUM.

Voluntary notification, where tried, has given, on the whole, unsatisfactory results—in that a very small percentage of cases has been notified to the Sanitary Authorities by the medical practitioners in attendance. The knowledge gained has, therefore, been more or less correspondingly small. Without compulsory notification, little headway will be made in connection with the prevention of consumption—early notification being specially necessary, and for such early notification bacteriology being a *sine qua non*. When the tubercle bacilli are present in the sputum, the patient is infectious. The time appears ripe for some form of compulsory notification of phthisis pulmonum (consumption) to be introduced, and Edinburgh Town Council have recently decided to make the experiment, as the Town Council of Sheffield did a few years ago when they applied for, and obtained, a private Act making the notification of consumption compulsory throughout the town for a trial period of five years. Up to date the trial has been justified, having proved successful. The prophecies of an unworkable scheme have not been fulfilled in practice.

FLOCK USED IN THE MANUFACTURE OF CHEAP BEDDING.

A scare was raised at the Bristol Sanitary Congress in connection with the filthy materials used in stuffing cheap pillows and mattresses—such materials being known in the trade as “flock.” It is found on chemical analysis that soluble organic matter exists in the “flock” and can be obtained therefrom by washing. This organic matter is derived from the dirt existing in the old and filthy rags (collected from dustbins, etc.) from which this cheap “flock” is generally made. The quantity of organic matter is proportionately greater than in samples of sewage, and the question naturally arises as to the danger to health from sleeping upon bedding made from such material.

Bacteriologically examined, matters are even more serious. The “flock” is found to be teeming with microbial life. Thus, one gram of cheap “flock” yielded, on bacteriological examination, 7,590,000 colonies of bacteria, as compared with 6,400,000 for London sewage (as discharged at Crossness). “Flock” is made from old and filthy rags, which are too bad to be remade into cloth. The rags are first treated in a machine, separating the cloth from buttons, etc., and then placed in another machine called a “devil,” wherein are revolving drums with spikes or teeth on the peripheries. These teeth or spikes shred the rags very finely, making a fluffy, woolly mixture, varying in colour from black to grey or brown. The rags are not

disinfected or sterilized previously to being used, nor are the "flocks" after being made, and it is these points that are being rightly focussed at the present day.

Disease may be spread by the use of infected rags in the manufacture of bedding, and rags that show, in the form of "flock," as many as between seven and eight million colonies of bacteria per gram may easily contain, amongst such hosts of bacteria, many pathogenic or disease-producing germs. Disinfection of the rags both before and after treatment is, therefore, needed, and legislation to enforce such required. The rags should be disinfected with saturated steam before treatment, and the resultant "flock" carefully washed before using it for the making of pillows and mattresses. The dark or coloured "flocks" are specially filthy—the whiter ones being made of rags carefully sorted and previously washed.

HEALTH SOCIETIES.

However advanced a Sanitary Authority may be, there is much work that may be usefully accomplished by the non-official workers of a Health Society. Taking the large number of churches and chapels, philanthropic and charitable institutions, university settlements, etc., that exist in most large towns, there are connected therewith many voluntary workers, whose exertions, properly organized and co-ordinated, would prove of the greatest use to the Public Health, and would thereby supplement the official work of the Health Department of a Sanitary Authority. The people would also be educated in the best way of making use of the sanitary advantages provided for them by Sanitary Authorities. The ostensible object of such a Health Society would be to popularize sanitary knowledge amongst all classes, and the scope of its work would include the following: (1) Teaching domestic hygiene, temperance, and thrift; (2) Visiting the homes of the poor, and instructing mothers how properly to feed and manage their infants; (3) Organizing lectures and addresses for district visitors and friendly talks for mothers' meetings; (4) Distribution of leaflets dealing with such health subjects as the prevention of infantile mortality and diarrhœa, measles, whooping cough, consumption, etc.

The Manchester and Salford Health Society has shown that good work can be accomplished in this way, and other Health Societies are succeeding in a similar direction.

INFANTILE MORTALITY.

1906 will be remembered for the National Conference on Infantile Mortality, held on June 13th and 14th, in London. The programme of subjects for discussion was as follows:—

1. *Administrative*:—Measures immediately practicable: (1) The teaching of infant feeding and nursing in schools; (2) The appointment of qualified women with special reference to the hygiene and feeding of infants; (3) The supply of pure or specially modified milk for the feeding of infants.

2. *Educative*:—Problems for discussion: (1) The influence of alcoholism on infantile mortality; (2) The relation of premature births to infantile mortality; (3) Infant life insurance.

3. *Legislative*:—Measures requiring further legislation: (1) Earlier

registration or notification of births; (2) Employment of women before and after confinement; (3) The regulation of the placing of infants out to nurse, and the amendment of the Infant Life Protection Act; (4) The sale and control of infant food stuffs; (5) The increase of the powers of Local Authorities in regard to milk supply; (6) The extension of the Midwives Act to Scotland and Ireland.

The results of the different discussions may be crystallized for future reference in the form of the following resolutions which were carried by the delegates :—

1. That the Education Department be urged to add instruction in elementary hygiene with reference to the dietary and rearing of infants, to their present scheme for systematically training girls in the senior classes in the practice and principles of personal hygiene and the elements of dietary.

2. That immediate legislation is required enabling Sanitary Authorities to establish or support depôts for the supply of pure, or modified, or sterilized milk, and to defray any cost out of the monies available for public health purposes.

3. That all still-births should be notified within forty-eight hours to the Medical Officer of Health of the district in which they occur, and that no burial should take place without a medical certificate.

4. That notification of all births be given within forty-eight hours to the Medical Officer of Health of the district in which they occur.

5. That the question of the insurance of infant lives under twelve months is one demanding serious consideration, and, with a view to receiving reliable information, the Government should be asked to appoint a Departmental Committee of enquiry on the whole question.

6. (a) That the period of one month's abstention from factory work away from home now imposed on mothers be extended to at least three months, and that, on their return to work, evidence must be produced, satisfactory to the Local Authority, that proper provision has been made for the care of the child. (b) That no employer of labour shall permit a woman advanced in pregnancy to engage in factory labour unless her ability therefor has been certified to the satisfaction of the Local Authority.

7. (a) That, having regard to the ascertained fact that in centres of industries where women are largely employed away from their homes, an excessive number of deaths of infants takes place, and that this is contributed to by the improper conditions existing at the houses in which infants are placed out to nurse, it is necessary that the persons by whom, and the places into which, infants are received, should be under supervision by the Local Sanitary Authority. (b) That the Infant Life Protection Act be amended to remedy abuses which are not at present provided against.

8. That all preparations offered or sold as food for infants should be certified by a Government Analyst as non-injurious, and that each packet should contain its analysis.

9. That the Dairies, Milkshops, and Cowsheds Order is defective, and that any amendment should extend the definition of disease as applied to animals, and should make the provision of regulations by Local Authorities compulsory. That the scope of the regulations should be extended to cover dirty milk, and should enable Local

Authorities to prohibit the sale of any milk which fails to comply with the conditions of purity agreed upon.

10. That the Midwives Act, 1902, should be extended to Scotland and Ireland.

At the close of the Conference it was unanimously agreed: "That the Conference resolve itself into a Committee to give effect to the foregoing resolutions, and with power to remit to an Executive Committee to carry out the same."

In Scotland, the Local Government Board addressed, during 1906, a circular letter to the Scottish Local Authorities, enclosing a copy of a leaflet by the late Dr. J. B. Russell on "Hints about the Management of Children." The Board stated that they sent this circular in view of the increasing attention given to the question of high infantile mortality and its remedies, suggesting that health visitors should explain the contents of the leaflet to the mothers visited, and should also furnish full information to every parent, as soon as possible after the birth of a child, of any infants' milk depôt that may have been established in the district concerned.

The notification of births is a subject which has an important bearing upon the prevention of infantile mortality. All Sanitary Authorities should be provided with particulars as to births within their respective districts at the earliest possible moment. At present, in England and Wales the time allowed is six weeks, and in Scotland three weeks. It would be better for these intervals of time to be lessened to (say) forty-eight hours. In this connection, the Huddersfield Corporation has succeeded recently in getting inserted in a local Omnibus Bill a clause requiring, during a period of five years, under a penalty, the future notification of each birth occurring within the borough to the Medical Officer of Health within forty-eight hours of its occurrence. A shilling fee is to be paid by the Corporation to the person first notifying, viz., the father (if residing in the house), or, in his absence, any person in attendance upon the mother (at the time of birth or within six hours thereafter).

No account, however short, of the preventive measures needed for lessening infantile mortality should omit reference to the importance of looking after the health of the mother during the period prior to the birth of her baby, and whilst suckling. All will agree as to the necessity for this. In France, special restaurants exist for the supply, at a nominal charge, or gratis, of soup, meat and vegetables, etc., for the nourishment of nursing mothers—the so-called Couillet's restaurants—and this principle is being tried in England at the present day.

INSPECTION OF FOOD.

An impetus has been given to the question of food inspection by the revelations of the Chicago meat scandals, and many Sanitary Authorities have had samples of tinned, canned, and otherwise preserved foods analyzed, bacteriologically and chemically, with a view to determining whether or not such foods were fit for human consumption. Speaking generally, the result of these analyses is to show that the published accounts in the lay papers have been exaggerated and have tended to create a scare amongst consumers, with consequent harm to the trade. The bacteriological examinations are made by opening each tin or can under aseptic conditions and inoculating

culture media with scrapings from the outside and inside portions of the contents, the media being placed in the incubator and kept at an equable temperature of 38° C. for 12-24 hours. The chemical examination consists of searching for preservatives, colouring matter, or metallic contamination.

Even the Government has felt it necessary to introduce legislation in the form of a short bill, called the Public Health (Regulations as to Food) Bill, which has been read a second time in the House of Commons (but, unfortunately, since withdrawn). The object of the Bill was to enable regulations to be made as to the importation, preparation, storage, and distribution of articles of food or drink (other than drugs or water) intended for human consumption.

The Metropolitan Medical Officers of Health Society have suggested the following reforms:—

1. The name and address of the manufacturer, and the date of canning, shall be impressed on the cans.

2. It shall be unlawful to sell *for any purpose* canned goods that are unfit for human consumption, and it shall be the duty of any person in the possession of unsound canned foods to notify and surrender same to the Local Authority, who shall destroy such unsound food, free of charge.

3. A certain number of cans (say one per cent) from each consignment shall be opened on importation, and the contents examined under the supervision and instructions of the Sanitary Authority concerned, prior to such canned goods being placed on the market.

4. Cans, which are known in the trade as "doubtfuls," shall be deemed to be unfit for human consumption.

5. Food intended for canning shall be inspected by independent officials prior to being canned, and all foods shall be canned under strictly hygienic conditions.

6. The use of preservatives in canned foods is unnecessary, and should under no circumstances be permitted.

That there is room for regulations of a more stringent character in connection with the canned foods which form such an important and far-reaching industry, is admitted by all, and legislation will be shortly forthcoming as the outcome of the Chicago scandals.

MILK DEPÔTS.

Statistics are accumulating, showing the good results that are being obtained from the proper and regular feeding of infants in connection with milk depôts established by Municipal Authorities. It is an acknowledged fact that the majority of infantile deaths are the direct or indirect result of the irregular and improper feeding, and anything that can be done in the way of educating mothers and others in the proper method of feeding infants should be done by all municipalities who conscientiously try to carry out their duties as Sanitary Authorities. As an object lesson and an educative influence in this direction, the establishment by a Sanitary Authority within their district of a milk depôt is of the greatest importance, altogether irrespective of the actual benefit to health that the infants fed thereat derive. Infantile mortality and morbidity are lessened, as shown by the statistics published in connection with the milk depôts that have been already established in various parts of the country, e.g., Liverpool.

Glasgow, St. Helens, Leith, Battersea, Lambeth, etc. The most recently published statistics (1906) are those of the Lambeth Milk Depôt, which was opened to the public on February 12th, 1906. The first six months' working shows a total distribution of 40,282 bottles of milk, representing the daily feeding for varying periods of 100 infants, belonging to the poorer classes, and below the average as regards bodily health at the time of commencing the milk. Indeed, 78 per cent were actually suffering from general wasting (the result of neglect, improper feeding, etc.), or from disease, so that the statistical results are specially noteworthy as representing what can be achieved amongst weakly and diseased infants, even allowing for the comparatively small number (100) dealt with.

The mortality rate varied from 58-90 per 1000, according as the rate was worked out on infants who had been continuously fed on the milk for a lengthened period, or on *all* infants (irrespective of the time during which they had been fed on the milk). This mortality rate is to be compared with the quinquennial rate of 134 per 1000 for the whole of the Borough of Lambeth (including all infants, whether healthy or otherwise), but may also, with justice, be compared with the quinquennial rates of 187 and 272 per 1000 for the districts or wards of the borough from which the depôt-fed infants are at present chiefly drawn. The contrast is startling, thus:—

Depôt-fed	-	-	58-90 per 1000
Whole Borough of Lambeth	-	-	134 per 1000
Marsh and Bishops Wards	-	-	187-272 per 1000

The Lambeth Milk Depôt is run on the lines of the French type, viz., strict medical supervision, discriminating and careful distribution of the milk only to infants who cannot be breast fed, and the systematic medical and clinical study of the effect of the milk on the infants using it; and it is noteworthy that the London County Council suggest that, for the County of London, future milk depôts that may be established shall be run on the Lambeth lines.

It is not claimed that milk depôts are the only method of lessening infantile mortality, but simply that they are a most important one, both actually and educatively. Other methods must also be adopted, e.g., care of mothers during pregnancy, and their education in the proper management and feeding of infants, prevention of the employment of married women in factories and workshops before and after the births of their infants, teaching of temperance and the laws of health, general sanitation, etc. No authority is justified in leaving any one method untried, and even the expenses connected with a milk depôt are justified when the resultant good from a health point of view is taken into consideration. A milk depôt cannot be a profit-earning concern, any more than certain other municipal institutions, e.g., isolation hospitals, sewage farms, public conveniences, etc.

MUNICIPALIZATION AND STANDARDIZATION OF DISINFECTANTS.

The Metropolitan Borough of Poplar has installed a plant for the manufacture and supply of electrolytic disinfectant. It is a revival of the old Hermite process by electricity, electrolyzed sea water or the "artificial" Hermite solution being the disinfectant used. The Poplar plant appears to be able to supply a disinfectant fluid at the rate of

185 gallons for 11s., or about 3s. 4d. per gallon. The solution, if run into bottles of non-actinic glass, corked with corks soaked in paraffin wax, will keep indefinitely. The active agent is a mixture of oxygenated chlorine compounds, including hypochlorous acid, and the solution is non-acid, non-corrosive, and non-poisonous. The solution is an efficient deodorant as well as, in the opinion of some observers, a reliable antiseptic. The Poplar Plant was erected by M. Hermite's English Agents, Messrs. Geipel and Lange, of Vulcan Works, 72A, St. Thomas Street, London, S.E. The fluid is mixed in an elevated tank, from which it flows through four double troughs, or cells, placed one above the other so as to ensure the liquid descending continuously by gravitation. Each double trough holds in each separate division five distinct "elements" (consisting of one positive and two negative plates—the former of thin platinum wire wound upon slate slabs, and the latter of zinc). There are thus 40 cells in all. The total space occupied by the electrolyzing plant (including the 215 gallon tank) is 7 feet by 7 feet, and its head-room 10 feet. During a run of eight hours, 185 gallons of hypochlorite solution at a strength of over four grams per litre are made. Several improvements have been introduced by the Poplar Borough Council, e.g., stability of the fluid, treatment of the oxychlorides, etc., and there can be no difference of opinion as to the simplicity and efficiency of the working of the plant, though there may be as to the bacteriological value of the disinfecting fluid when produced, the hypochlorite solution being, in the opinion of some, unstable, and, in the presence of organic matter, untrustworthy as a disinfectant.

The question of the municipalization of disinfectants is the outcome of the need (admitted by all) for their standardization. How can Health Authorities and ratepayers guarantee that the disinfectants they use are efficient and capable of doing what their names should include, viz., kill disease germs. The answer to this question is the standardization of disinfectants, and a further question naturally suggests itself as to the nature of such standardization. Shall disinfectants be standardized chemically or bacteriologically? All experts are agreed that the latter method is the more suitable, and for this purpose Dr. Rideal and Mr. Ainslie Walker use, as a standard, pure carbolic acid (or phenol) and a pure cultivation of the *Bacillus typhosus*. The germicidal value of a disinfectant is stated in terms of the action of the pure carbolic acid (or phenol) upon the pure cultivation of the *Bacillus typhosus*, and is compared with it as a carbolic acid co-efficient. To ascertain this carbolic acid co-efficient, the strength of a disinfectant solution which will kill a pure cultivation of the *Bacillus typhosus* in a given time is divided by the strength of carbolic acid solution which will kill the same germ in the same time and under exactly similar conditions. This method appears simple, but, nevertheless, it has come in for a very large amount of adverse criticism—the chief of which is the fact that disease germs are not met with in practice in pure cultivation, but are found to be mixed in varying proportions with organic substances—a condition of things which tends to make the results obtained by a particular method of standardization untrustworthy.

It is clear that the method of testing should be such as to secure uniformity of result. In this connection it is noteworthy that the

Disinfectants Standardization Committee of the Royal Sanitary Institute have reported during 1906 as follows:—

1. No one method of testing disinfectants can indicate their relative values under every possible condition—such values should be specially determined for the given case required, the “Thread Method” being desirable where penetration is important, and the “Drop Method” for general purposes.

2. The bacteriological test is to be carried out with pure broth cultures of the *Bacillus typhosus*, using sterilized water as the diluent of the disinfectant.

3. All nutrient broth is to have a constant reaction of +15.

4. Where special conditions exist which may interfere with the activity of the disinfectant, the consumer is to be advised to call for the same conditions to be embodied in the test.

It is clear that tests must be based on practical as well as theoretical considerations, and a truly efficient disinfectant must not only be a germicide, but must also be compatible, as far as possible, with the organic matters met with in the excreta of disease. A germicide is useless practically, if it fails to act in the presence of the organic matter of pathological products. The sooner the different experimenters acknowledge this fact, the sooner shall we arrive at a solution of the problem of what is an efficient disinfectant for use by Sanitary Authorities under municipal conditions.

PRESERVATIVES IN MILK.

The Local Government Board has issued during 1906 a circular letter to all Authorities under the Sale of Food and Drugs Acts, suggesting the advisability of action being taken under the Sale of Food and Drugs Acts in regard to preservatives in milk, and asking that Public Analysts should be instructed accordingly. The Board in their letter make reference to the report of the Departmental Committee on preservatives and colouring matters in food, which states that such Committee, “after hearing evidence from milk traders, concluded that the addition of a preservative to milk is not necessary for the purposes of the milk trade, even in hot weather, or where the supply of so large a place as London is concerned, and recommended that no preservatives should be added to milk.”

The commonest preservatives used in milk are (1) Formalin (a 40 per cent solution of formic aldehyde) and other preparations of formic aldehyde; and (2) Boron preparations (boric acid, borax, or mixture of boric acid and borax)—the former being, in the opinion of the Committee, specially objectionable, even in minute quantity, on account of the alterations effected by formalin in the character of certain of the constituents of milk, and its liability to interfere directly with digestive processes. The latter preservative is also objectionable in the case of milk, and should be excluded therefrom, having regard to the immense importance of pure milk for the nutrition of infants, invalids, and convalescents, and of the comparatively large quantity of milk which may be taken, particularly by children, in comparison with other foods. Moreover, boracized milk has an injurious effect upon the health of very young children. The presence of formalin in milk to an amount which is ascertained by examination within three days of collecting the sample to exceed 1-40,000 (1-100,000 of formic

aldehyde) raises a strong presumption that the article has been rendered injurious to health, and that the purchaser has been prejudiced ; and also that similar presumption is raised when boron preservatives are present in milk to an amount exceeding 57 parts of boric acid per 100,000 or 40 gr. of boric acid per gallon.

The Board suggests that the addition of preservatives to skim milk, separated milk, and condensed milk, should be watched and controlled on similar lines.

SCHOOL FEEDING OF CHILDREN.

The subject of the need for the feeding of school children has been much discussed during the year, and the result has been the passing of an Act. All are agreed that there are children at school who are under- (or wrongly-) fed, and who, consequently, need proper feeding. How is this to be accomplished ? Out of the rates or by voluntary means ? There are many arguments for and against, and much has been said in respect of the lessening of parental authority. As in all other matters, extreme views must be abandoned, and a middle course taken. Medical Officers of Health have issued statistics showing that the percentage of emaciated or starved children is very small. Thus, in Bradford, 2 per cent, and in Blackburn 1·3 per cent, were found, on examination, to be poorly nourished or under-fed. Taking these results as a fair average for the country generally, it would appear that the expenses connected with feeding such under-fed children out of the rates should prove but slight. In many towns voluntary systems of providing meals exist, and are proving satisfactory. The whole question is a wide one, pointing to the need for mothers being educated in the proper care and management of their children, not only at school ages but previously, and the Act that has just been passed for providing meals for underfed children in elementary schools should prove of advantage by providing the necessary buildings, furniture, and apparatus, and, in certain cases, by allowing a $\frac{1}{2}$ d. rate to be used for providing food.

LEGAL DECISIONS

AFFECTING MEDICAL MEN AND THE PUBLIC HEALTH.

By JOSEPH PRIESTLEY, B.A., M.D., D.P.H.,

Medical Officer of Health, Metropolitan Borough of Lambeth.

ADULTERATION OF FOOD AND DRUGS.

LOWERY *v.* HALLARD (King's Bench Division).

Sale of Food and Drugs Act, 1875, ss. 14, 22—Brandy sample taken—Division of Sample into three parts so that each part is sufficient for Analysis.

Half a pint of brandy was purchased and divided in the usual way by the Inspector into three parts, consisting of (by weight) 5, 3, and 2½ oz. respectively. The Public Analyst received the part weighing 5 oz., this being, he stated, the least amount he could do with for a successful analysis. The private analyst, to whom the vendor sent his part (weighing 3 oz.), stated that it was insufficient in quantity for a satisfactory analysis to be made. The brandy was found to be adulterated with 29 per cent of proof spirit derived from some source other than the grape. The vendor was convicted, and fined £5 with £10 costs by the Magistrate, and appealed against the decision on the ground that the part left by the Inspector with the vendor was not sufficient in quantity for the purposes of a proper analysis.

Held, that where an article of food is purchased for analysis, each of the three parts into which it must be divided in compliance with the Statute, though they need not be exactly equal, must be sufficient to afford an independent analysis. *Appeal allowed.*

SUCKLING *v.* PARKER (King's Bench Division).

Sale of Food and Drugs Act, 1875, ss. 14, 21, 22—Milk—Sale for Analysis—Division of Sample into three parts—Production of Sample retained by Inspector and its Condition (preventing a satisfactory Analysis).

A pint of milk was purchased by a deputy for an Inspector, was divided into three parts, each of which was poured into a separate bottle, which was afterwards carefully corked and sealed and marked in the usual way. The milk was adulterated, with 12 per cent butter-fat deficient, and proceedings were taken before the Magistrate. The vendor called for the Inspector's sample to be produced in Court, and the milk was, on production, found to be fermented, with the result that the bottle was partly "blown." The condition of the milk prevented the Somerset House authorities being able to make a confirmatory report. The Magistrate convicted, and an appeal was lodged on the ground that the Somerset House analysis and certificate were not forthcoming.

Held, that the sample having been produced in accordance with the Act, if the Magistrate found as a fact that it had been properly sealed or fastened up in such manner as its nature permitted, it was not a

condition precedent to a conviction that it must be in such a condition as to be capable of analysis, and it was not incumbent that the sample sent for analysis by the Magistrate under s. 21 of the Food and Drugs Act, 1875, must necessarily be the sample retained by the Inspector.

Appeal allowed.

TANNER *v.* DYBALL (King's Bench Division).

Sale of Food and Drugs Act, 1899, s. 6—Margarine Act, 1887, ss. 3, 6—Margarine sold as "Marvo."

A butter-substitute, known as "Marvo" (registered by Act of Parliament) was sold under statutory conditions as required for margarine, but the vendor was convicted by the Magistrate and fined £2 (with costs), on the ground that there was a sale of "Marvo" under a name other than the name of margarine, and that the notice did not plainly state that "Marvo" was margarine, but simply that "Marvo" was a new butter-substitute equal in flavour to the finest dairy butter, and to comply with the provisions of the Food and Drugs Acts is sold as margarine. A case was stated for the opinion of the High Court.

Held, that if margarine is sold as margarine, and all the conditions of the Sale of Food and Drugs Acts are complied with, it can also be sold under a fancy name, such as "Marvo," and that such a sale does not constitute an offence under s. 3 of the Margarine Act, 1887.

Appeal allowed.

WATTS *v.* STEVENS (King's Bench Division).

Sale of Food and Drugs Act, 1875, s. 25—Adulterated Milk—Retailer's defence of Warranty—Written Warranty in general terms, and its application to subsequent deliveries of Milk.

A general warranty had been given in August, 1905, and the Magistrate held that such warranty covered a delivery of milk in December, 1905.

Held, that the warranty of August, 1905, was not a continuing warranty, and did not cover the milk purchased in December, 1905.

Appeal allowed.

BURIAL GROUNDS.

GODDEN *v.* HYTHE BURIAL BOARD (Court of Appeal).

Burial Act, 1855, s. 9—Burial within 100 yards of Dwelling House—Ground "not already used" as a Cemetery.

It was held in the High Court that no burials should take place within 100 yards of dwelling houses by s. 9 of the Burial Act, 1855, even though such houses had been erected since the passing of the Act, except on ground already used for burials ("already" meaning prior to the passing of the Act in 1855), or except with the consent of the owner. The Court of Appeal affirmed this decision.

Held, that "already" meant "at the time of the passing of the Act."

Appeal dismissed.

BY-LAWS.

ATTORNEY-GENERAL and WOOD GREEN URBAN DISTRICT COUNCIL *v.*
MELVILLE and KING (Chancery Division).

Public Health Act, 1875—Building By-laws—Erection of Domestic Building in five Blocks—Single Entrance but through Communications—Adapted for use by more than one Person.

This was an action brought by a Sanitary Authority against the owners to restrain them from building so as to contravene the Authority's by-laws respecting air-space and other matters. The building consisted of three blocks each of two storeys, and two blocks each of one storey, all structurally united together, but with only one entrance, from which a continuous way ran through all the blocks.

Held, that the building, although adapted for use by more than one person, was structurally constructed as one building and must be treated as being one building, and, that being so, it complied with the by-laws. *Action dismissed.*

LONDON AND SOUTH WESTERN RAILWAY COMPANY *v.* HILLS.
(King's Bench Division).

Public Health (London) Act, 1891, s. 39—By-laws—Fitting or fixing in connection with any W.C., any apparatus or any Trap or Soil pipe—Repairing existing Water-closet—Notice to Sanitary Authority.

The Railway Company fitted or fixed in connection with certain water-closets an apparatus or trap without first giving notice of their intention so to do to the Sanitary Authority, thereby contravening by-law 14 made by the London County Council. The Magistrate convicted, and stated a case for the High Court.

Held, that by-law 14 of the London County Council By-laws did not apply only to new water-closets, but also to the fixing of an apparatus, trap, or soil-pipe in connection with any existing water-closet. *Appeal dismissed.*

CLEANSING OF CESSPOOLS.

STAINLAND, ETC., SOCIETY *v.* THE URBAN DISTRICT COUNCIL.
(King's Bench Division).

Public Health Act, 1875, ss. 42, 44—Cleansing of Earth-closets, Privies, Ashpits, and Cesspools—Duty of Sanitary Authority.

A cesspool receives the drainage of the premises, consisting of a shop, slaughter-house, and stables, and the occupiers of the premises were of the opinion that the duty of cleansing the same rested with the Sanitary Authority, which had passed a resolution pursuant to s. 42 of the Public Health Act, 1875, viz.: that "the cleansing of privies, closets, and ashpits be undertaken by the Authority at once"—a by-law having previously been passed calling upon the occupiers of premises to cleanse every cesspool once at least in every three months. The Magistrate decided against the occupiers, and inflicted a fine for breach of the by-law, and against this decision an appeal was lodged on the ground that the words of s. 42 of the Public Health Act,

1875 were to be read conjunctively, and that the Sanitary Authority, having decided to cleanse privies, closets, and ashpits, were bound to cleanse also cesspools.

Held, that the words of s. 42 of the Public Health Act, 1875, must be read distributively, and that a Local Authority may undertake or contract for the cleansing of earth-closets, privies, ashpits, and cesspools, or such of them as they may by resolution decide to deal with.

Appeal dismissed.

COMBINED DRAINAGE.

HARVEY *v.* BUSHBY (King's Bench Division).

Metropolis Local Management Act, 1855, ss. 74, 250—*Drain or Sewer—Combined Scheme—Extra House included in Scheme.*

A plan was approved by a Sanitary Authority in London for drainage, by a combined operation, of three houses, to which a fourth house had been added without the sanction of the Authority. A nuisance from defective drainage was discovered and a notice served upon the owner. The Magistrate decided that the combined drain, by reason of the addition of the fourth house, was not a "drain" but a "sewer."

Held, that the combined drain was a "sewer."

Appeal dismissed.

KING AND OTHERS *v.* POPLAR BOROUGH COUNCIL (County Court).

Public Health (London) Act, 1891—*Sewer or Drain—Owner opening up on request of Inspector.*

At the request of a Sanitary Inspector, an owner opened up a system of drainage which proved to be a sewer repairable by the Sanitary Authority. The owners claimed from the Authority the cost of the opening up (£46).

Held, that an owner cannot recover the cost of opening up a sewer upon the verbal order or request of an Inspector.

Judgment for Defendant.

COMMON LODGING HOUSES.

PARKER *v.* TALBOT (Court of Appeal).

Common Lodging Houses Acts, 1851 and 1853—*London County Council (General Powers) Act*, 1902—*Common Lodging Houses Act (Ireland)*, 1860, ss. 2, 3.

This was an appeal from a decision of Mr. Justice Kekewich, who stated that he was bound by the decision of the Divisional Court in *Gilbert v. Jones* (see *Medical Annual*, 1906, p. 568), when it was held that the words "common lodging house" do not necessarily imply the letting and hiring of lodgings for payment.

Held, that a house carried on as a charitable institution, to which destitute persons of the very poorest class are admitted, and treated and dealt with in a manner similar to the frequenters of common lodging houses, is not a common lodging house within the Common Lodging Houses Acts of 1851 and 1853, and the London County Council (General Powers) Act, 1902, if no payment of any kind is made by or on behalf of the persons admitted.

Appeal allowed.

INFECTIOUS DISEASES.

BURY AND DISTRICT JOINT HOSPITAL BOARD *v.* GUARDIANS OF
CHORLTON UNION (Manchester Assizes).

Public Health Act, 1875, ss. 131, 132—Poor-law (Certified Schools) Act, 1862—Divided Parishes and Poor-law Amendment Act, 1882, s. 13—Reception of Pauper Children from Local School into Hospital for Infectious Diseases—Children chargeable to Union outside Hospital District—Recovery of Expenses.

Children from one Union, attending a school situated in another Union, were removed to hospital on account of infectious disease—the hospital being situated in the same Union as the school. The hospital authority claimed the expenses connected with the treatment of such children from the Union to which the children belonged, though, prior to their removal to hospital, the consent of the Guardians of that Union had not been obtained.

Held, that the plaintiffs could not recover under any statutory provisions, nor under the plea of urgency. *Judgment for Defendants.*

INHABITED HOUSE DUTY.

LONDON COUNTY COUNCIL *v.* COOK (King's Bench Division).

Revenue Act, 1903, s. 11—Exemption of Inhabited House Duty—Exemption of Cubicles in Common Lodging Houses.

This was an appeal against the decision of the Commissioners of Income Tax to the effect that the cubicles of common lodging houses are not separate dwellings within the meaning of s. 11 of the Revenue Act, 1903.

Held, that the decision of the Commissioners of Income Tax be upheld. *Appeal dismissed.*

LIABILITY OF LOCAL AUTHORITY.

STANBURY *v.* MAYOR, ETC., of Exeter (King's Bench Division).

Diseases of Animals Act, 1894, ss. 2, 22, 35—Sheep Scab Order, 1898—Liability of Local Authority for act of Negligence of Inspector.

A duly appointed Inspector detained sheep on suspicion of scab disease for forty-eight hours, a ram being suspected, and the suspicion was afterwards proved to be unfounded. It was alleged that the Inspector acted negligently, and that damage resulted to the owner of the sheep. An action was taken against the Local Authority (the Mayor, etc., of Exeter) in the County Court, and it was held by the Judge that the Inspector, when he detained the sheep on suspicion, was not acting in performance of duties imposed by statute upon the Mayor, etc., of Exeter, but under and by virtue of an order of the Board of Agriculture. Judgment was entered for the Defendants, and against this decision an Appeal was lodged.

Held, that no action will lie against a Local Authority in respect of the alleged negligent conduct of an Inspector appointed by them under the Diseases of Animals Act, 1894, in seizing and detaining sheep in a market under the provisions of the Sheep Scab Order, 1898, on suspicion that the sheep were infected with scab disease.

Appeal dismissed.

MEDICAL PRACTITIONER.

CRIER AND WIFE *v.* HOPE AND CURRIE (King's Bench Division).

Medical Practitioner—Duty to Prevent Infection—Nature of Disinfection after visiting Infectious Case before attending a Confinement.

Negligence was alleged whereby scarlet fever was carried from one patient of a medical practitioner to another in the course of two hours. The disinfection adopted by the medical practitioner consisted of washing his hands and arms with lysol, changing his coat and putting on another which was reserved for obstetrical cases. On arriving at the second patient's house, he took off his overcoat, his coat, scrubbed his arms and hands with soap and water with a special obstetrical nail-brush, then used corrosive sublimate, then lysol again. He then put on obstetrical indiarubber sleeves, which had previously been disinfected by boiling. These processes were again repeated before finally attending to the patient. Between the time of the attendance on the scarlet fever patient and the attendance on the confinement it was not possible to take a bath and change all his clothes.

Held, that the medical practitioner had taken the usual precautions, and that there had been no negligence. *Judgment for Defendants.*

[Application was made to the Court of Appeal for a new trial, but the application was unanimously dismissed.]

REMOVAL OF HOUSE REFUSE.

WANDSWORTH BOROUGH COUNCIL *v.* BAINES (King's Bench Division).

Public Health (London) Act, 1891, s. 30—Removal of House Refuse—Failure to Remove without Reasonable Cause—Notice to place Refuse on the Kerbstone under By-law.

Daily removal of house refuse had been undertaken by the Wandsworth Borough Council, and, in accordance with the by-laws, a public announcement had been duly made, calling upon the occupiers concerned to deposit their refuse on the kerbstone, or on the outer edge of the footpath immediately in front of the house, in suitable movable receptacles. This the occupier of a detached house (standing some forty feet from the highway) refused to do, though he declared his willingness to provide a convenient place on his premises where the house refuse might be placed for removal. The Sanitary Authority refused to remove the refuse unless placed on kerbstone or on outer edge of the foot-path immediately in front of the house. The Magistrate decided against the occupier, and convicted.

Held, that the order issued by the Sanitary Authority under the by-laws was *ultra vires*, and that the Sanitary Authority could be convicted of refusing to remove the occupier's house refuse without reasonable cause. *Appeal dismissed.*

SEWAGE DISPOSAL.

HOBART *v.* SOUTHEND-ON-SEA CORPORATION (King's Bench Division).

Public Health Acts, 1848 and 1875, ss. 48 and 27—Sea Fisheries Act, 1868, ss. 51, 53—Sea Fisheries Regulation Act, 1888, s. 2—Southend

Local Board Act, 1887, s. 5—Sewage Discharged into Sea—Pollution of Oyster Beds—Injunction.

The Southend Local Board discharged sewage in a crude state without any treatment into the estuary of the Thames, thereby polluting neighbouring oyster and shell-fish beds, the proprietors of which applied to the High Court for an injunction and claimed damages.

Held, that the Sanitary Authority must keep their noxious matter from trespassing upon their neighbour's land. *Injunction granted.*

[The Southend Local Board appealed against the injunction, but an agreement was come to.]

FOSTER *v.* WARBLINGTON URBAN DISTRICT COUNCIL (Court of Appeal).

Sewage discharged into Sea—Pollution of Oyster Beds—Right of Local Authority to Pollute.

The proprietor of certain oyster beds entered an action against a Sanitary Authority for polluting his oyster beds with sewage, and obtained damages. Against this decision an appeal was lodged.

Held, that the Sanitary Authority had no prescriptive right to discharge sewage so as to contaminate the oyster beds.

Appeal dismissed.

ATTORNEY-GENERAL *v.* DORCHESTER CORPORATION (Court of Appeal).

Public Health Act, 1875, ss. 17, 27, 299—Local Government Board's Provisional Orders Confirmation Act, 1900 (Dorchester Order. Article 21).

A Provisional Order, confirmed by Act of Parliament, called upon the Dorchester Corporation to carry out works for the disposal of the sewage of their district. These works were carried out without negligence, but they created both a public and a private nuisance, whereas s. 27 of the Public Health Act, 1875, empowers a Local Authority to carry out such works "provided no nuisance is created." The High Court held that the Provisional Order did not exonerate the Sanitary Authority, and that any works carried out under such Order were to be carried out without nuisance to anyone.

Held, that the Provisional Order was only a direction to the Local Authority to exercise the powers of s. 27 of the Public Health Act, 1875, and did not exempt the Local Authority from their obligation to carry out the work without creating a nuisance. *Appeal dismissed.*

TRADE REFUSE.

MAYOR, ETC., OF WESTMINSTER *v.* GORDON HOTEL COMPANIES
(King's Bench Division).

Public Health (London) Act, 1891, ss. 30, 33, 141—Removal of Refuse—House Refuse—Trade Refuse—Refuse of Hotels.

The Westminster City Council refused to remove as "house refuse" from a large hotel, refuse consisting of ashes from grates, sawdust strewn on the kitchen floors, empty sauce bottles and preserve tins, straw packing-cases, tea-leaves, waste-paper, egg-shells, lemon-peel, general dust from rooms and staircases, and (occasionally) small quantities of broken crockery, on the ground that such were "trade

refuse." The Magistrate convicted the City Council, and on appeal it was *held*, that the refuse was "house refuse," and that the City Council, as the Sanitary Authority, were bound to remove it without payment. *Appeal dismissed.*

UNDERGROUND BAKEHOUSES.

STUCKEY AND OTHERS *v.* HOOKE (Court of Appeal).

Factory and Workshop Act, 1901, s. 101—Landlord and Tenant—Underground Bakehouse—Expenses of Structural Alterations—Apportionment by Court of Summary Jurisdiction—Jurisdiction of High Court.

This was an appeal against the decision of the High Court to the effect that such Court had jurisdiction and could (and, as a fact, did) reverse the decision of the Court of Summary Jurisdiction (see *Medical Annual, 1906, p. 571*).

Held, that the High Court had no such power. *Appeal allowed.*

UN SOUND MEAT.

GIEBLER *v.* MANNING (King's Bench Division).

Public Health (London) Act, 1891, ss. 47, 107, 123—Unsound Meat—Prosecution by Sanitary Inspector on behalf of Sanitary Authority—No express Authority—Right of Private Individual to Prosecute.

Unsound meat (5 lbs.) was seized by an Inspector, and proceedings were taken under s. 47 of the Public Health (London) Act, 1891, in the usual way. The meat was condemned by the Magistrate and destroyed. The Magistrate convicted, though it was pointed out that the Inspector had not received any express authority by resolution or in writing, general or special, from the Sanitary Authority. Against this decision an appeal was lodged.

Held, that a private individual may take proceedings under Section 47 of the Public Health (London) Act, 1891, and that, therefore, it is unnecessary for a Sanitary Inspector to have the express authority of the Sanitary Authority, and that the words in the information "on behalf of the Sanitary Authority" could be rejected as mere surplusage.

Appeal dismissed.

GRIVELL *v.* MALPAS (King's Bench Division).

Public Health (London) Act, 1891, s. 47—Unsound Meat seized on Retailer's Premises—Action taken against Wholesale Dealer—"Liable to be seized."

A retail butcher purchased from wholesale dealer some meat which was afterwards found to be diseased, and was seized by an Inspector whilst it was hanging in the doorway of retail butcher's premises. A summons was taken out by the Inspector against the wholesale dealer, but the Magistrate held that there had been no exposure for sale.

Held, that the words "liable to be seized" in subsection 3 of s. 47 of the Public Health (London) Act, 1891, mean liable to be seized at the time of the sale by the wholesale dealer, and that it is not necessary that it should have been exposed for sale by the person who had brought it from the original vendor. *Appeal allowed.*

THE EDITOR'S TABLE.

In this section we endeavour to bring before our readers the work that is being done by inventors, and the manufacturers on their behalf.

May we emphasize our desire already expressed that samples, together with descriptions and small illustrations (if necessary), should reach us by NOVEMBER. We experience some difficulty in obtaining compliance with these necessary conditions, and trust that our friends will recognize its importance.

In respect to Pharmaceutical Products and Dietetic Articles, we are always ready when a sufficient quantity is sent to us *early in the year*, to arrange for it to be tested in Hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires. We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the *Medical Annual* has come to be valued. If we departed from the principles which have guided us since the first volume of the *Annual* was published, we should forfeit a position which enables us to be of some use both to the practitioner and the manufacturer.

MEDICAL AND SURGICAL APPLIANCES.

Apron for Midwifery and Operative Work.—Messrs. Reynolds & Branson, Ltd., of Leeds, send us a thin waterproof apron, which occupies but little space and yet forms a complete protection. It is capable of being washed and sterilized without injury, and costs only 4/-. We can highly recommend it.

Aseptic Dressing Table.—We illustrate (*Fig. 61*) a simple aseptic dressing table, not on account of its novelty, but of its cheapness. It has a glass top and two white enamelled shelves, with tubular legs. The cost is from 25/- to 40/- each, according to size, and whether it is furnished with castors or not. Formerly this kind of appliance has been very expensive, and we are obliged to Messrs. R. Sumner & Co. for calling our attention to it.

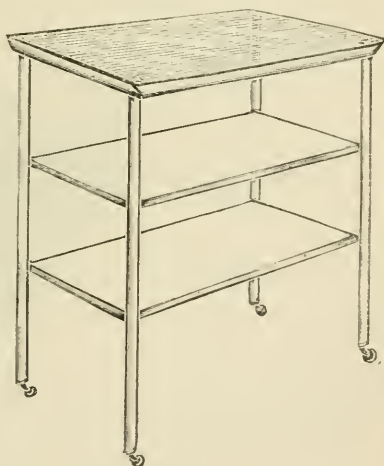


Fig. 61.

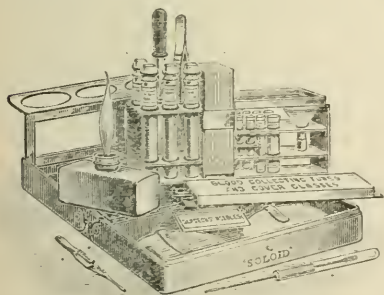


Fig. 62.

Bacteriological Case.—This case, issued by Messrs. Burroughs, Wellcome & Co., is a triumph in the art of neat packing and arrangement. The "Tabloid" method of preparing all the stains, etc., lends itself to compactness and also to portability, yet it is wonderful what a miniature chemical laboratory has been condensed into so small a space (*Fig. 62*.)

We give a list of its contents, as it shows how completely the needs of the bacteriologist have been thought of. Three stoppered bottles, containing methyl alcohol $1\frac{1}{2}$ dr., absolute alcohol $1\frac{1}{2}$ dr., distilled water $1\frac{1}{2}$ dr. A rod-stoppered bottle containing Canada balsam, a graduated pipette, one pair of forceps (small tweezers), one pair of bulldog forceps, twelve microscopic slides, a spirit lamp, one metal case of needles (straight No. 9), a glass funnel, two watch-glasses, a packet of filter papers in parchment envelope, twelve blood-collecting pipettes, fifty cover slips, a sterile swab and a glass rod (for powdering "Soloid" stains, etc.). One tube each of the following "Soloid" microscopic stains: methylene blue, eosin, methyl violet, fuchsin, Romanowsky stain, eosin-methylene blue, hæmatoxylin (Delafield), and Toison blood fluid. The whole is contained in a polished metal case, protected by a silk bag. It can easily be carried in the pocket of an overcoat, and the cost is only 25/-.



Fig. 63.

Bandages and Dressings (Compressed).—Messrs. Burroughs, Wellcome & Co. inform us that they now issue these sterilized when asked for.

Plaster of Paris Bandages.—We have received a sample of these bandages from Messrs. A. de St. Dalmas & Co., of Leicester, to show the great attention they have given to their manufacture. The plaster is well incorporated, and they are perfectly smooth and free from grittiness.

Bed Bath (The Rotunda).—This bath was specially designed for use in the Rotunda Hospital, Dublin, and is particularly well adapted for all gynæcological or obstetric cases.

The platform is slightly concave and slopes towards the pan, which ensures comfort and obviates leakage. It is easily cleansed, all corners are rounded, and it is very light and durable. It measures 13 inches by $11\frac{1}{4}$ inches, depth 3 inches. The cost is 7/-, or, with outlet, 7/6. We highly recommend this "bath," which is made by Messrs.

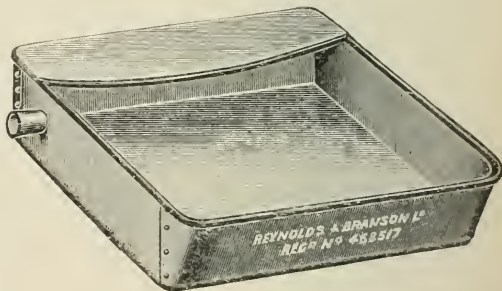


Fig. 64.

Reynolds & Branson, Ltd., of Leeds (Fig. 64).

Bedding (Sanitary).—Considerable attention has been called during the past year to the abominable filth with which mattresses and other bedding are stuffed. Dirty rags and carpets torn to shreds by a "devil," and as much as possible of the dirt preserved, so as to add to the weight of the product, is what those who buy the cheaper qualities of bedding sleep upon. It is hoped that legislation will render this abomination no longer a legitimate branch of commercial enterprise.

Mr. T. R. Freeman, of the Monkton Combe Mills, near Bath, recently opened his "flock" mills to the Sanitary Congress, and showed how, by elaborate machinery, the flock can be produced as a perfectly sanitary material at a cost of three to five shillings a cwt. more than the unclean material. But while the sale of dirt to add to the weight of flock is commercially more profitable, it will continue. We advise our readers to investigate this subject, and we are sure Mr. Freeman would report upon any doubtful samples sent to him.

Blood Examination (Instruments for).—Mr. T. Hawksley, of 357, Oxford Street, W., has devoted considerable attention to the appliances used in the examination of the blood and the determination of the blood-pressure. He has kindly demonstrated to us the facility with which a number of these appliances can be used in clinical work. The demand upon our space makes it impossible to describe each of these in detail, but we think our medical friends in need of such appliances would do well to write to Mr. Hawksley for illustrated pamphlets dealing with each. An instrument for testing the viscosity of the blood is of great clinical value at the present moment, and the one shown us by Mr. Hawksley appears to be quite practical and accurate. For further information as to the use of this appliance reference may be made to Dr. Emanuel's article on Examination of the Blood on page 137.

Catheter (a Back-flow) for Urethral Irrigation.—Messrs. Down Bros. have made, at the suggestion of Dr. Hey Groves, Assistant Surgeon, Bristol General Hospital, a back-flow catheter, through which any quantity of fluid can be made to irrigate the whole urethra without entering the bladder. The instrument consists of a metal catheter, with a bulbous extremity, curved in the ordinary way. The eyes of the catheter consist of three apertures situated at the junction of the stem and the bulb. The greatest diameter of the bulb is three sizes larger than that of the stem: No. 4 for the stem and No. 7 for the bulb is considered the most useful size. The shoulder of the bulb fills up the urethra in front of the eyes, and all the lotion escapes in a rapid stream at the side of the stem. The best arrangement is to attach the instrument by means of a rubber tube to a reservoir containing one quart of the lotion.

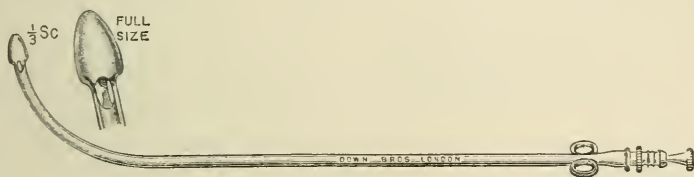


Fig. 65.

The instrument is passed, with the ordinary precautions, as far as the compressor urethræ, where it is naturally arrested. This is far enough for a case of anterior urethritis, but in posterior urethritis the instrument should be passed into the bladder, and then withdrawn until the bulb is felt to be just grasped by the vesical orifice. The reservoir is raised three feet above the patient's bladder, and the quart of lotion takes three to five minutes to run out. An intelligent patient can be taught to do this for himself night and morning, and provided he sterilizes the catheter each time, there is no more risk of septic infection than when he uses an injection with an ordinary glass syringe. The rapid improvement in cases where it is used will soon convince anyone of the practical utility of the device. An ordinary glass syringe can, of course, be used instead of the douche reservoir (Fig. 65).

Catheter (Female).—Messrs. R. Sumner & Co. send us a female catheter, made of glass, enclosed in a metal case (Fig. 66), which opens at both ends

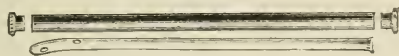


Fig. 66.

to permit of ready sterilization. This costs sixpence, complete. The idea is good, as the practitioner can carry several, and leave one at the house, when required, to be well boiled before his next visit. It saves time.

Catheter Sterilizer.—How best to sterilize catheters is still a vexed problem. We illustrate (in *Fig. 67*) a method which recommends itself on account of its practicability.

The metal case forms a sterilizer, and into this is placed a specially designed tray which serves as the catheter holder. When the catheters have been

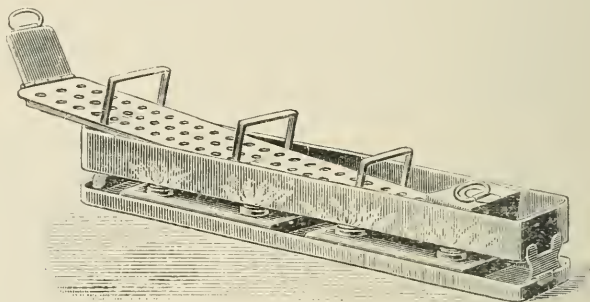


Fig. 67.

sterilized the tray is lifted out and hung up, to allow the catheters to drain into the receptacle at the lower end. The price of the whole arrangement is 23/-, and it is produced by Messrs. R. Sumner & Co., Liverpool.

Chloroform Mask (Improved).—A very much improved mask for holding the lint during the administration of chloroform (*Fig. 68*) has been sent us by Messrs. R. Sumner & Co., of Liverpool. It is very light, fits well to the face, and clamps the lint well. It costs 3/6.

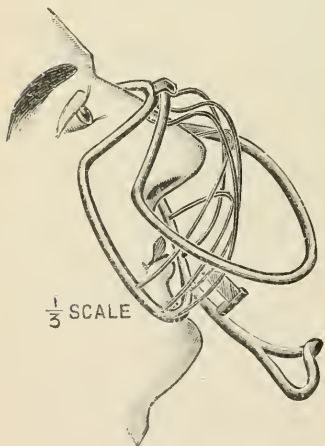


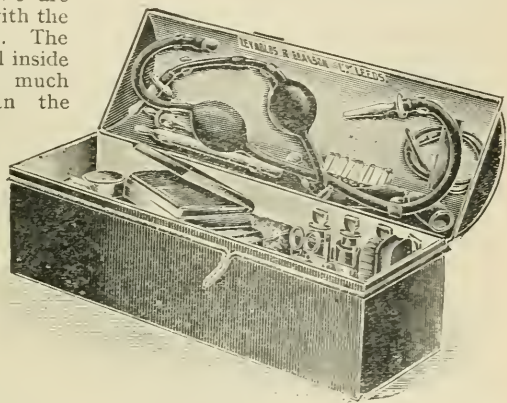
Fig. 68.

Curettes.—A set of uterine flushing curettes in a metal box is supplied by Messrs. R. Sumner & Co., of Liverpool. These curettes are excellently made, very compact, and the complete set only costs 7/6. It is wonderful how cheaply really good instruments are now produced, with the result that the practitioner buys more of them and is better equipped for everyday work.

Douche Thermometer.—When douches or liquids are ordered at a certain temperature it is very important to have a suitable thermometer at hand. Messrs. Sumner have introduced one which screws into a metal case, making breakage difficult, and which the nurse can hang on her chatelaine, as it has a ring attachment. It registers to 200° F. The price is 1/6.

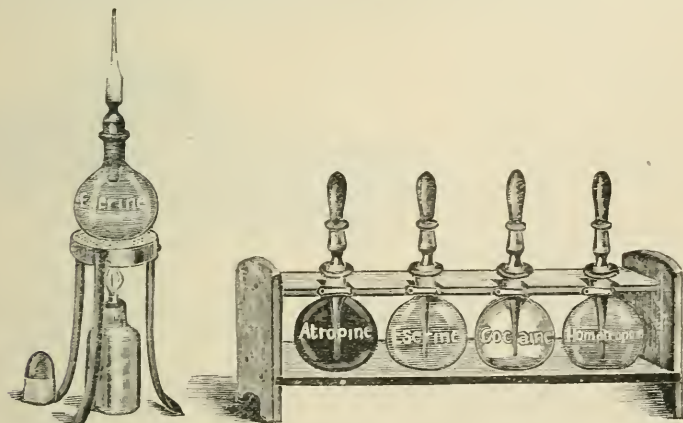
Dressings.—A new method of packing dressings has been brought under our notice by Messrs. R. Sumner & Co. The dressing is simply folded upon itself in a neat cardboard box, so that when required for use a sufficient quantity is cut off without disturbing or exposing the whole dressing. It is very simple and practical. We understand that the firm propose to supply all their dressings in this form.

District Nurse's Case.—This was made at the suggestion of Nurse Barnes, by Messrs. Reynolds & Branson, Ltd., of Leeds (*Fig. 69*), and it possesses all the practicability which we are accustomed to associate with the productions of this firm. The case is metal, white enamel inside and black outside. It is much cleaner and lighter than the ordinary hand-bag and is very inexpensive. It contains wool, band ages, nail brush, four bottles, soap-box, towel, enema complete, catheter, small enema which can be used for sinus, ear, or nasal syringe, vaginal tube, finger stalls, scissors, thermometer, small sterilizer, pins, etc. Measures 14 in. by $4\frac{1}{4}$ in. by $5\frac{1}{2}$ in. deep. It would make a nice present to a district nurse as a mark of appreciation.

*Fig. 69.*

Ethyl-Chloride Bottle.—The bottles for spraying ethyl chloride are not very satisfactory, and Messrs. Hedley & Co., of 92, Harrow Road, Leytonstone, N.E., who manufacture an exceptionally pure form of ethyl chloride, have given great attention to the subject. They consider that the spring stopper which releases the ethyl chloride should be separate and interchangeable. This means that the bottle remains quite air-tight until it is required for use, and then the spring stopper can be adjusted immediately. We think the arrangement is quite the best which has yet been arrived at. The "Hedley Stopper" costs only one shilling.

Eye Drop-Bottles.—We illustrate here (*Fig. 70*) a useful and ready method of keeping solutions for treatment of ophthalmic affections. There are four flasks of different colours, and distinctly labelled "Atropine," "Eserine,"

*Fig. 70.*

"Cocaine," and "Homatropine," each with a pipette stopper. There are also supplied a spirit lamp and tripod for heating the solution. The cost of the whole appliance is 8/6. Messrs. R. Sumner & Co.

Eye Test for Railway Servants.—This takes the form of a lamp which has been designed by Dr. G. D. Todd, of Selby, for testing railway servants for myopia and colour blindness. The lamp should be lit and held at a distance of $12\frac{1}{2}$ yards from the patient, which is equivalent to 600 yards' distance from an ordinary signal lamp. Behind a small aperture $\frac{1}{8}$ in. diameter is a lens and a revolving wheel, on which are fixed coloured glasses, red, blue, green, and white. The lamp is an ordinary candle lamp adapted to meet these requirements. It is portable, easy to work, and can be held by the operator or easily fixed to a hook on the wall. The arrangement is very practical and ingenious, and the invention has been well worked out by the manufacturers, Messrs. Reynolds & Branson, Ltd.

Flat Foot.—Under the name of the "Pezplanus," Messrs. Holland & Son, of 46, South Audley Street, W., have introduced an improvement on their well-known "sock" for flat foot (*Fig. 71*). The essential difference is that the

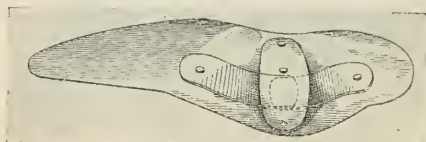


Fig. 71.

which prevents fracture. This method gives greater strength, and where a stronger and more enduring support is required will answer the purpose well. At the same time, the proportion of elasticity has been retained which ensures comfort and adaptability.

Another distinct feature is that the leather-moulded sole, the foundation of the sock in the "Pezplanus," will resist dampness and perspiration, being stronger and of a better nature. Great as the success of the "improved" sock has been, it is felt that the "Pezplanus" will, in severe cases which require a strong support, yield better results, while still retaining the feature of elasticity for which these supports are so much valued.

Messrs. K. R. Schramm & Co., 116, Albany Street, N.W., have also given a large amount of attention to appliances for the treatment of flat foot. We illustrate here (*Fig. 72*) a sock intended for mild cases, where the tendency is only slight. The pressure of the spring is mainly directed against the plantar surface at the region of the waist of the foot. It answers its purpose admirably, and causes no discomfort.

For more severe cases the K.R.S. double-action spring is strongly recommended. This consists of nickel-plated best English metal, and is not covered with leather, but worn as a half-sock. The arch-elevating part is connected to the plantar plate in such a manner as to ensure elasticity without noticeable friction. It is very ingenious and efficient.

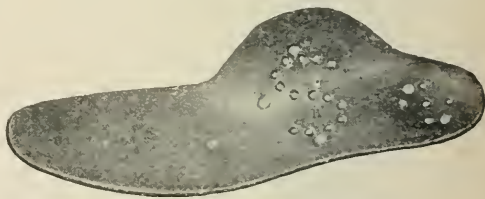


Fig. 72.

Funnels (Aluminium).—Messrs. R. Sumner & Co. have sent us some funnels made of aluminium, which, we are glad to see, are indented to admit air to the tube. The smaller sizes are well adapted for fitting into catheters and stomach tubes, the larger ones convenient for dispensing. They range in price from 7d. to $1\frac{1}{8}$ each.

Gas Fires.—The troubles with coal fires for sick patients' bedrooms and for surgeries are many and great. Most of these may be obviated by the intelligent adoption of gas; and in these days of cheap supply, the expense as compared with coal is not worth considering. Prejudice has perhaps existed in regard to gas fires as being unhealthy in operation. This, however, is not so when adequate ventilation is provided, and a scientifically constructed gas fire placed in an ordinary grate possesses few drawbacks in this respect, whilst for cleanliness, convenience, and adaptability for use in cases of sickness, it is far ahead of coal. Such a fire seems offered in the "Blenheim." We have not been able to test it in action, but have carefully examined its component parts, which certainly seem to possess important improvements. The fire may be fixed in any grate. The construction of the air chambers and burners is such as to naturally throw off any particles of dust or asbestos falling upon them, and thus to avoid the clogging, which is a common fault. The gas itself is discharged into the mixing chambers through minute holes at a high velocity, the effect being to minimize or prevent lighting back. This construction also prevents the hissing sound which is the unpleasant accompaniment of many gas fires—the maker *guarantees* their noiselessness, a high desideratum in the case of nervous invalids. A duplex tap is provided, whereby half or the whole gas supply is shut off as desired by simply turning one tap instead of the two usually provided. A special brick back, shaped to throw the heat on to the floor level, is also supplied. We consider this fire worthy of trial, and notice by the prospectus many references to it from medical men. The maker and patentee is Mr. Wm. Edgar, Blenheim Works, Hammersmith, W.

Gastro-Enterostomy Clamp (Improved).—Mr. J. Basil Hall, M.C. Cantab., Surgeon to the Royal Infirmary, Bradford, has had made a curved clamp forceps of the Doyen type, for use in gastro-enterostomy (*Fig. 73*). The blades are $4\frac{1}{2}$ inches long, serrated diagonally, bowed in the usual manner, and they obtain a very evenly distributed pressure over an ample area of the

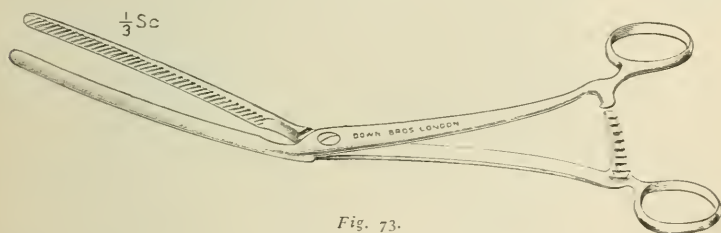


Fig. 73.

stomach wall. The blades are bent at an angle of 20 degrees with the shanks, which is just sufficient to allow the shanks to lie perfectly flat upon the body wall when the stomach is well lifted into the abdominal incision. The length of the shanks is rather greater than usual, and the handles are consequently well out of the way during suturing. Messrs. Down Bros., Ltd., are the makers.

Graduated Bullet Forceps and Probe.—Mr. William Sheen, M.S., of Cardiff, has designed a set of graduated bullet forceps and probe for use in connection with the telephone bullet detector. These forceps are made in two sizes—the larger, designed for the removal of bullets generally, and the smaller for the removal of bullets from the brain. The forceps are so constructed that they may be attached directly to the telephone bullet detector and used as a combined probe and forceps, or they may be used in combination with the specially designed graduated probe attached to the detector in the following manner: the bullet having been located by the probe, the forceps are introduced along the probe, the jaws of the forceps being provided

with a deep oblique groove for this purpose (*Fig. 74*). In both methods the telephone detector is in uninterrupted contact with the bullet during extraction—an advantage which much facilitates the operation, and ensures

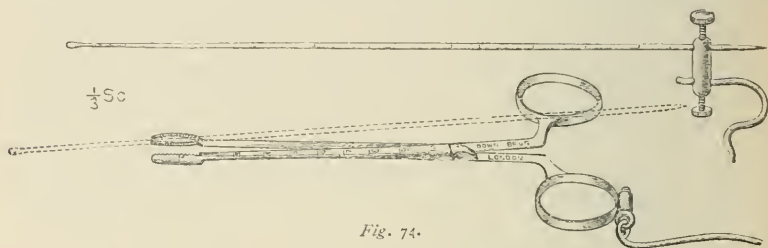


Fig. 74.

the least possible disturbance of tissue. In cases where the forceps are used as a probe and forceps combined, the connection attached to the forceps is composed of silver wire, which can be readily sterilized, and while of sufficient

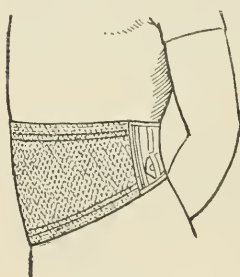


Fig. 75.

rigidity to avoid the risk of accidental short-circuiting with the patient's body, is flexible enough not to interfere with delicacy of manipulation. The makers are Messrs. Down Bros., Ltd., who have protected the invention by patent.

"Grippa" Belt.—This is one of the latest productions of the Domen Belts Co., of 436, Strand, W.C. The "Grippa" belt is intended for men, and especially those who tend to obesity. We have seen several cases in our own practice where there was some degree of enteroptosis in the male, causing pain and fatigue which was unaccounted for. The wearing of a belt to give support to the abdominal organs gave immediate relief. The use of a suitable belt should not be overlooked in male patients, and the Domen Belt Co. have always given us satisfaction. We believe the "Grippa" belt (*Fig. 75*) will be much appreciated.

Inhaler (Vest-Pocket).—This is intended for the inhalation of menthol, pinol, eucalyptus, or terebene, and is conveniently arranged for carrying in the pocket, and for use when enclosed in the hand, so that it can be employed in public rooms without attracting attention. It is manufactured by Messrs. Parke, Davis & Co.

Lens Trial Frame (New Form).—A new trial frame for lenses (*Fig. 76*) has been devised by Mr. F. P. S. Cresswell, F.R.C.S., of Cardiff, to be used when testing young children. All the forms at present in use fail to keep in position on a child's face, owing to the fact that they depend upon resting on the child's nose, which in most young children is too small (the bridge not being sufficiently prominent) to give the required support.

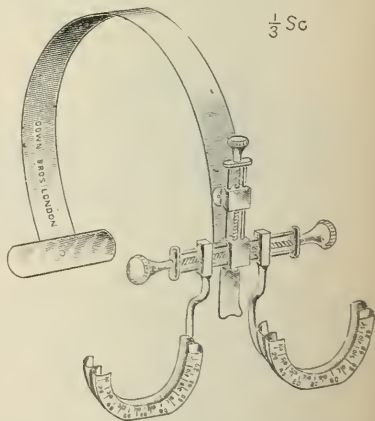


Fig. 76.

The present model is designed to obviate this difficulty, the frame being dependent from a spring head-band, such as is already known in connection with a laryngoscopist's forehead lamp. The frame can be easily fixed in position on the child's face, and then finally adjusted by two simple screw movements, the one to alter the distance between the lenses, and the other to raise or lower, so as to get the lenses properly centred. The front end of the band ends in a notch which fits just above the bridge of the nose, not to support any weight, but merely to ensure putting the frame straight. Mr. Cresswell has had one in use now for some time, and finds it most satisfactory. The makers are Messrs. Down Bros., Ltd., London.

The "Masta" Pipe.—For the benefit of those who smoke, we have been experimenting with this pipe. We can recommend it as fulfilling the advantages claimed by the makers. The smoke is drawn through a tube of ordinary calibre: but in its passage from bowl to mouth it passes first through a condensing receptacle in which moisture, etc., is deposited, and, secondly, through a cooling chamber. The principle is thoroughly sound, and provided these chambers are shaken out after use, and occasionally cleansed, there is no clogging nor fouling, and the pipe keeps cool, dry, and sweet. The Masta P. Pipe Co., 153, Fleet Street, E.C., are the manufacturers.

Midwifery Bag and Sterilizer (Combined).—A sterilizer is an absolutely necessary part of the equipment of every accoucheur. How to carry it to the best advantage is a problem which there have been many attempts to solve. Messrs. R. Sumner & Co., of Liverpool, offer a solution which appears

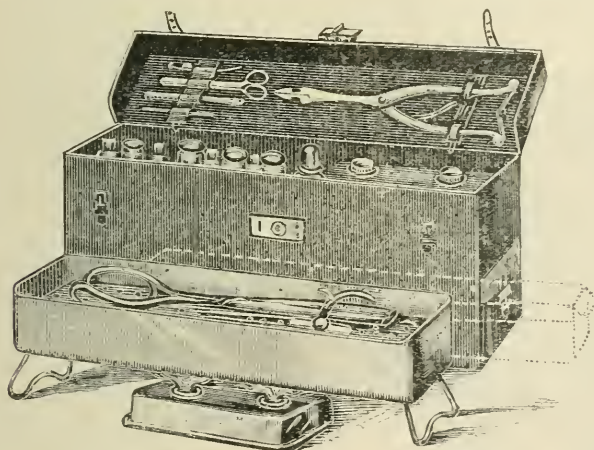


Fig. 77.

to us very practical. They produce a bag of solid leather, with a compartment beneath, into which the sterilizer fits, and the larger instruments are carried in the sterilizer itself, the upper portion being reserved for the bottles, lamp, apron, gloves, etc.

The accompanying illustration (*Fig. 77*) conveys a good idea of the arrangement, which, we think, is almost as perfect as it is possible to be.

Minimeter (The Bimetric).—This is a simple appliance by which minims and cubic centimetres can be accurately measured. It consists of a graduated pipette into which the fluid is at first drawn and then released drop by drop by an ingenious device which does not involve squeezing the bulb. This appliance will find many users, alike in the dispensary, the laboratory, and the dark room. It is manufactured by Messrs. Parke, Davis & Co.

Minor Operating Case and Sterilizer (Combined).—Every year sees some advance in the manufacture of aseptic surgical instruments, but we doubt if anything has yet been produced so perfectly adapted to the minor surgery of the general practitioner as the case which has been sent to us by Messrs. R. Sumner & Co. The case itself measures 8 by 3 inches: it contains a spirit lamp and folding stand, which at once converts it into a sterilizer, just large enough for every purpose. Within are three electroplated trays containing the various instruments. This arrangement differs from ordinary surgical cases in the fact that the instruments are easily removed and replaced. Usually the replacing of instruments after an operation is like a Chinese puzzle, so exact is the arrangement. There is also the advantage that, the trays being arranged on the table, the instruments remain aseptic. There is a well contrived metal case for holding the needles: the six scalpels are all metal and of British make. It also contains combined artery forceps and needle holder, straight and curved aseptic dressing scissors, splinter forceps, combined spatula, frænum and tongue depressor, tenaculum, spring forceps, Spencer Wells' forceps, Péan's artery forceps, double Volkman's spoon, director and aneurysm needle, two probes, and six operating knives. When we say that the price of the whole case is only £2 2s., it will be seen what a marvellous advance has been made not only in practicability, but in cheapness. We can strongly recommend this case to our readers. An illustration of it will be found on the advertisement page inside the front cover.

Motor-Car Medicine Case.—Messrs. Burroughs, Wellcome & Co. have brought out a black japanned metal case with rounded corners, measuring $7\frac{1}{2}$ by $4\frac{1}{4}$ by 2 inches (*Fig. 78*), which is suitable to carry when motoring or touring. It comprises simple remedies

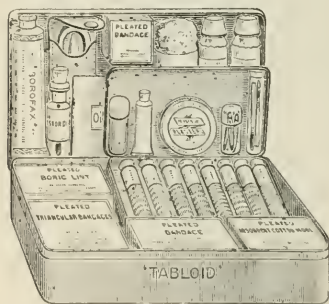


Fig. 78.

and such accessories as will enable first-aid treatment to be administered in the event of accident. The range of dressings, etc., which the case contains will place the motorist in a position to deal promptly with slight accidents and at once to administer first-aid treatment in more serious cases, until the services of a medical man have been obtained.

The contents may be varied to meet individual requirements, but the case as usually sent out is fitted as follows: Pleated dressings, comprising one packet of two triangular bandages, one $2\frac{1}{2}$ in. and one 1 in. open wove bandage, one ounce absorbent cotton wool, and one ounce boric lint. All of these dressings are compressed, and occupy little space. One pair of folding scissors, eye sponge, two camel-hair pencils in glass tube, three yards $\frac{1}{2}$ in. plaster in tin, court plaster, oiled gauze, safety pins and ordinary pins; bottles of carron oil, sal volatile, and castor oil (with brush); tubes of "borofax" and "protective skin"; "tabloids" of quinine bisulphate, gr. 2, soda mint, cascara sagrada, gr. 2, phenacetin compound, bismuth salicylate, gr. 5, potassium chloride and borax, lead subacetate, gr. 10, boric acid, gr. 6 (perfumed, for use as a lotion for the eyes, etc.).

The case is well arranged and the requirements of the motorist are carefully considered. The case would be equally useful to the ordinary tourist.

Mouth Props for Use during Surgical Anæsthesia.—Messrs. Down Bros., Ltd., have made, to the instructions of Mr. McCardie, M.B., anæsthetist to the General Hospital, Birmingham, a set of mouth props for use during surgical anæsthesia (*Fig. 79*). They are made of metal, and hollow, possessing and following advantages over the older form made in vulcanite: (1) They are

sterilizable and indestructible by boiling or strong antiseptics; (2) They allow of respiration when the jaws and lips are closed on and around them (a very important point in edentulous patients and people with full lips); (3) Two of them are flattened at one end, in order to make introduction easier during anæsthesia. The large one is usually placed between the teeth before anæsthetizing strong men, and it gives a very free way for air or fluid and keeps the jaws well apart. The smallest prop may be useful in children.

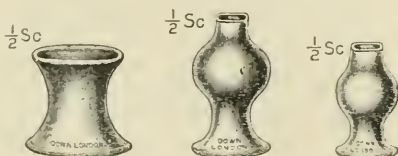


Fig. 79.

Muslinette Over-all.—We show (Fig. 80) a costume which the practitioner attending an infectious case or performing an operation may wear. It is made of "muslinette," which is a light waterproof sheeting, capable of being washed with antiseptics and unaffected by boiling water, so that it can be readily made aseptic. The price of the coat and helmet is 12/6. It is introduced by Messrs. R. Sumner & Co., Liverpool.



Fig. 80.

Nasal Forceps.—A pair of long, thin, bent forceps, which are perfect for reaching or opening up the posterior nares for examination, are sent us by Messrs. R. Sumner & Co. The angle allows one to see what one is doing whether they are used for throat, ear, or nose. They will also answer well for opening up a sinus. The makers tell us they have had a very large sale for them, and we are not surprised, as no ordinary forceps fill their place. They cost 3/6.

Ophthalmoscope.

Mr. N. Bishop Harman has invented an ophthalmoscope which appears to present many novel and practical features and to represent a distinctly new departure in such appliances. We believe it has the approval of our Ophthalmic Editor, Dr. Hugh Thompson. The description given of this instrument in the *Lancet*, July 1st, is too long to enable us to reprint it. We have not had an opportunity of personally testing the appliance; but the makers have sent us an illustration (Fig. 81) which shows the general arrangement of the instrument, and we would suggest that our readers who are interested should apply to Messrs. J. Weiss & Son, Ltd., 287, Oxford Street, W., for further particulars.

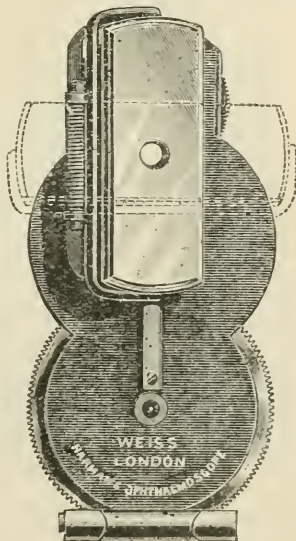


Fig. 81.

Peritoneal Irrigator (Two-way).—Mr. H. M. W. Gray, F.R.C.S. (Aberdeen), has designed a two-way peritoneal irrigator. He is of opinion that, in spite of the

weighty reasons for dry swabbing in purulent peritonitis, irrigation with normal saline solution is better, provided one can irrigate without forcing infective fluid in to non-infected areas; he considers that this is practically impossible by the ordinary methods of irrigation, and he has therefore had made by Messrs. Down Bros., Ltd., an instrument as shown in the illustration (*Fig. 82*), which permits localized flushing. The instrument consists of a central tube made bell-shaped at its distal end, so as to dissipate the force of the injected fluid. The egg-whisk arrangement, which is made

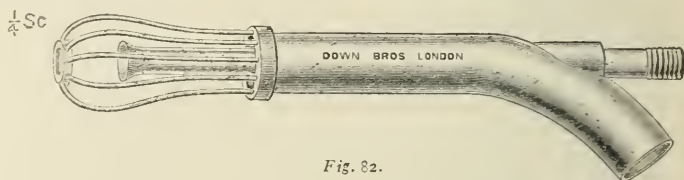


Fig. 82.

of strong, smooth wire, prevents coils of bowel pressing around the mouth of the exit tube, and thus obstructing the outflow of the irrigating fluid, and at the same time allows irrigation of the adjacent parts. The exit tube surrounds the delivery tube at its proximal end, and the exit area is several times greater than the sectional area of the delivery tube. An indiarubber tube is attached to the exit tube of sufficient length to reach a receptacle at the side of the operation table. When this rubber tube is filled with solution a strong syphon action is obtained. The advantage of this is evident, as if by any chance the suction draws intestine between the wires of the "whisk" part, gentle nipping of the rubber part will tend to remedy the tendency. Finally, the instrument can be taken to pieces for cleaning purposes.

Pessary (Hodge).—We are particularly pleased with a new form of pessary which has been brought to our notice by Messrs. R. Sumner & Co., of Liverpool.

Its form is that of the Hodge, but it is perfectly flexible, like the ring pessary, so that after it has been introduced it regains its shape. We shall certainly give this pessary an extended trial, as we think it will meet the difficulties in many cases, and be worn with greater comfort than the ordinary "Hodge."



Fig. 83.

Photographic Outfit.—Messrs. Burroughs, Wellcome & Co. have introduced a complete and compact chemical outfit for developing and fixing plates, films, bromide or gas-light papers, and for toning and fixing P. O. P. It provides a convenient supply of reliable photographic chemicals, and will be found extremely useful for medical radiographic or case record work. *Standard Contents.* — "Tabloid" metol-quinol developer, to make 44 ounces of solution; "Tabloid" pyro developer, "Tabloid" combined toner and fixer, "Tabloid" hypo- and "Tabloid"

to make 40 ounces of solution;
to make 30 ounces of solution;

potassium bromide. These are put up in a neat, black japanned, metal case, which occupies very little space in the travelling bag or upon the shelf (*Fig. 83*).

Phonendoscope and Stethoscope (Combined).—In a neat little leather purse, which lies flat in the pocket, both a phonendoscope and a stethoscope can be carried. This arrangement is accomplished by attaching the terminals to flexible rubber tubes; but it is more portable than it at first appears, because the vulcanite rod of the phonendoscope, which is only needed for very accurate localization, is inserted into the shaft of the instrument in ordinary use and when being carried. The cost is but 9/-, and we must congratulate Messrs. Sumner & Co. on the best of the many excellent portable phonendoscopes which they have brought under our notice from time to time.

Plasters.—We have received from Messrs. A. de St. Dalmas & Co. samples of their hospital strapping spread on holland. What we like about the plaster is, that it is always ready for use, and always sticks even when it has been stocked a long while. There is no better strapping for general use. They also forward us samples of their rubber adhesive plaster ribbon. These are spread both on cotton and holland, and are very convenient and reliable. We always feel sure of this firm's productions, and can commend them to our readers.

Rubber Gloves.—Messrs. R. Sumner & Co. send us very soft and flexible rubber gloves suitable for surgeons' use, which are warranted to stand boiling, and which they produce at 2/- to 2, 6 per pair. We are sure that our surgical friends will be glad to know this.

Speculum (Duck-Bill).—We show here a new form of duck-bill speculum, one end being elongated (*Fig. 84*). It is found in practice that this end serves well for a depressor or channel, while the operator's hand is more out of the way than in the ordinary speculum. It is a distinct improvement on the older shape. Messrs. R. Sumner & Co. produce them at 3, 6 each.



Fig. 84.

Sprays (Nose and Throat).—We have previously called attention to the advantages of the miniature throat sprays manufactured by Mr. Frank A. Rogers, of 327, Oxford Street, W. There are many disadvantages in having a large bottle attached to the spray. It is inadvisable to put more of the fluid for vaporization into the bottle than will last the patient for forty-eight hours at the most. When this is recognized, the old-fashioned spray will disappear from use. A further improvement which Mr. Frank Rogers has introduced is a miniature spray, with a rubber-bulb fixed parallel to it, so that the bottle and bulb are grasped with one hand, while the other can be used for holding the tongue depressor or nasal speculum. The spray is equally useful for nose and throat, and is especially adapted for use in applying cocaine, or other local anæsthetic prior to use of cautery, etc., as it permits of the application being localized.

One of this form of spray is put up in a neat leather purse, so that the patient can carry it in his pocket, and use it under conditions which would otherwise be impossible. These should be ordered as "Rogers' Pocket Spray." It is quite the best thing of its kind.

Surgical Dressings.—We have previously called attention to the antiseptic dressings of the Galen Manufacturing Co., of Wilson Street, S.E., which are always absolutely reliable. We notice that they are now putting up dressings

in the compressed form. The sterilized gauze pads and cotton mops of this firm are well known to surgeons as the most aseptic form of surgical sponge. Surgical cat-gut is another speciality of the Company, and it is not only good but put up in a thoroughly aseptic condition and convenient for use.

Syringe (Ear and Wound).—This presents a new form of syringe (*Fig. 85*). It is entirely made of metal, and the upper end has no cover. The piston is retained in position by a bayonet-mouth, and can be easily removed for cleansing and sterilizing. We are glad to find that the plunger is most

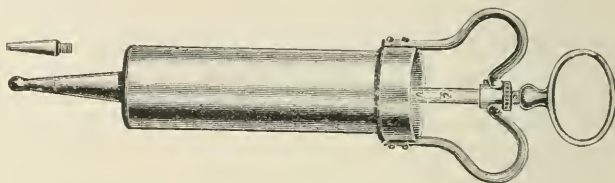


Fig. 85.

accurately ground to the barrel, and thus it is free from the objection which applies to many all-metal syringes we have used, for the piston works particularly smoothly, and the grip afforded by the finger-ring is excellent. It is made in three sizes of 2, 3, and 4 ounces, which cost from 8/6 to 10/6 each. R. Sumner & Co., Liverpool.

Syringe (Hypodermic).—The Opaline all glass.—All the parts of this syringe are of glass, and the piston is milk-white in colour, which assists the legibility of the graduation. It is also so constructed that its case forms a sterilizer. It is supplied with either steel or platinum iridium needles, and we suggest the latter. This is a very complete arrangement for ensuring aseptic injections. Price 8/-. Messrs. R. Sumner & Co., Liverpool.

Syringe (New Post-Nasal).—We illustrate here (*Fig. 86*) a new post-nasal syringe intended for use by the mouth. It permits of a gentle, well-spread stream of fluid to wash out the post-nasal cavity. In some cases the use of the syringe would be impossible owing to irritable fauces and a "high backed" tongue; in others it would answer excellently. It is necessary to select cases before ordering it. It is made by Messrs. C. J. Hewlett & Son, 33-42, Charlotte Street, E.C., whose liq. boracic co. conct. is a most effective injection in cases of post-nasal catarrh.

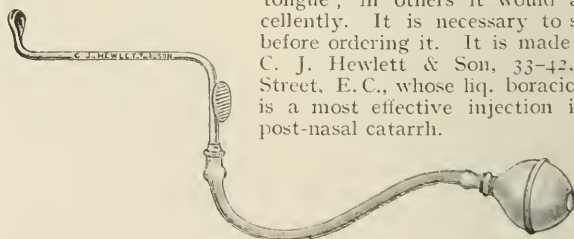


Fig. 86.

Transformer for Cautery and Light.—Messrs. Mottershead & Co., of 7, Exchange Street, Manchester, have manufactured an excellent transformer for cautery and light where the continuous current 200 to 220 volts is available, and also for 100 volts. The amount of current actually consumed by this transformer when a cautery burner is being heated does not exceed the amount required for lighting a 16-candle-power incandescent lamp, consequently the apparatus may be connected with any wall-plug or lampholder. For cautery the quantity of current is regulated by a rheostat, and all burners for nose, throat, ear, eye, and similar operations can be used. For surgical lamps the pressure of current is regulated by a separate rheostat, through which

any low-voltage lamps, such as those used for forehead, throat, and cystoscopic purposes may be illumined to any desired intensity; such lamps may be used simultaneously with the cautery when desired. It will be seen therefore that it has many advantages over other transformers. The cost is £13 and £14, according to voltage.

Thermos Patent Flask.—This flask will hold about a pint of fluid (*Fig. 87*). If the fluid is hot, it will remain hot for twenty-four hours; if the fluid is an iced drink, it will remain cold for about two weeks. Messrs. Reynolds & Branson, Ltd., of Leeds, have produced this remarkable appliance, and we have carefully tested it and found that the claims of the makers are fully justified. They think that it would be useful to travellers, sportsmen, and for medical purposes. We quite agree with them. The cost is 21/-.

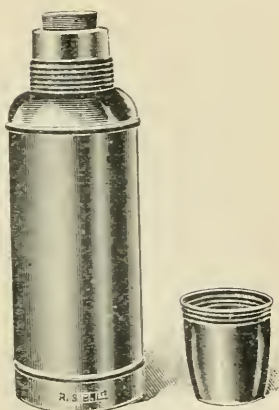


Fig. 87.

Urea and Uric Acid (Method for Determination).—New methods for the determination of urea and uric acid have been worked out by Dr. A. F. Dimmock and F. W. Branson, F.I.C. The necessary apparatus is simple and inexpensive, and is supplied by Messrs. Reynolds & Branson, Ltd., of

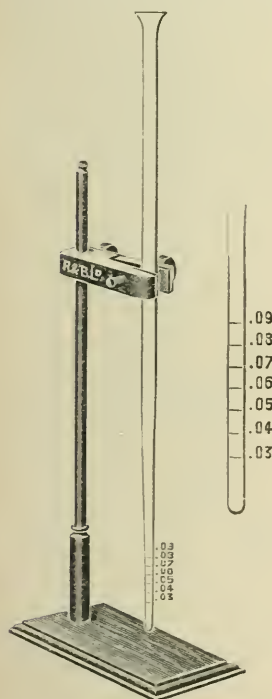


Fig. 88.

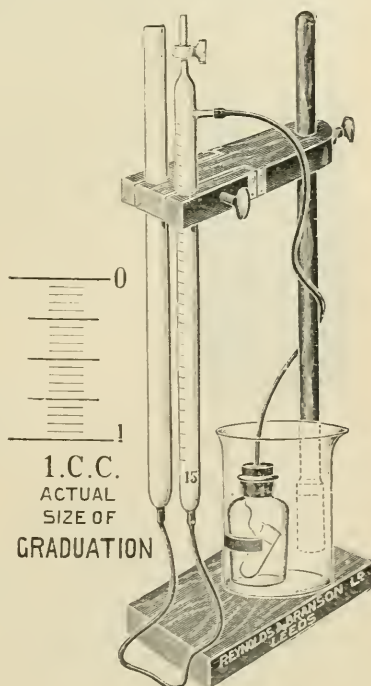


Fig. 89.

Leeds. There is now no reason why the practitioner should not work out the quantities of urea and uric acid in various diseases, and as a result of any special method of treatment, for himself. For convenience of permanent reference we give the details of each method :—

The method No. 1 consists in precipitating the uric acid from a slightly alkaline solution as urate of ammonium, and measuring the precipitate in a glass tube which is narrowed at one end (*Fig. 88*).

100 cc. of urine are taken and placed in a conical flask (Erlenmeyer) of about 400 cc. capacity; to this is added 1 gram of lithium carbonate, and the whole boiled for three minutes. By this means, practically the whole of the phosphates are precipitated, and free carbonic acid is eliminated.

The liquid is filtered whilst hot, to remove precipitated earthy salts, etc., which are washed with a little distilled water, until the filtrate measures 100 cc., when cooled to 60° F. To 50 cc. of the filtrate which contains the uric acid as lithium urate, 5 grams of ammonium chloride are added, shaking the flask until dissolved. After three minutes the contents of the flask are warmed to 120° F., so as to secure a uniform aggregation of the precipitated urate of ammonium. The whole is now poured into a tube graduated in parts per hundred of uric acid, and deposition allowed to take place, the reading being taken after twenty-four hours have elapsed. If the urine does not contain a high percentage of uric acid, the reading can be taken in four hours.

Process No. 2 consists in the precipitation of the uric acid by means of ammonium chloride, washing the precipitate until the chloride of ammonium is removed, and treating it in a closed glass bottle with hypobromite solution and noting the amount of nitrogen gas evolved. The method employed is to add to 100 cc. of the urine at a temperature of 40 degrees C. 31 grams of ammonium chloride, shaking until the salt is dissolved, and allow at least two hours for the precipitate to subside.

The apparatus (*Fig. 89*) is also well adapted for the determination of urea, 25 cc. of hypobromite solution and 5 cc. of dilute urine 1 in 5 being used.

After the volume of the gas in the burette has become stationary, and the pressure has been adjusted by means of the levelling tube, read the volume of the gas from the graduations of the burette. Then note the temperature and barometric pressure.

Varico Bandage.—Under this name Messrs. A. de St. Dalmas & Co., of Leicester, have produced a light and porous elastic bandage for varicose which at once commends itself to us. It will give ample support to the limb without producing heat or irritation. We would strongly advise our readers to sample one of these bandages, as we feel sure they will be pleased. (*Fig. 90*).



Fig. 90.

Wound Retractor.—We illustrate here (*Fig. 91*) a new form of wound retractor which has been sent to us by Messrs. R. Sumner & Co. It is very light and strong, and will retain the wound open without the aid of an assistant. It is made in three sizes, the smaller being well adapted for tracheotomy cases. The cost is 5/6, 6/6, and 8/6 respectively. The illustration shows how useful this instrument will prove in many operations.

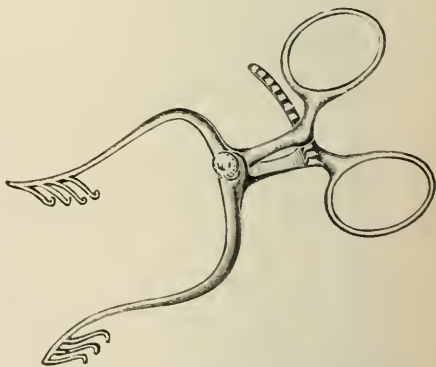


Fig. 91.

PROGRESS OF PHARMACY, DIETETICS, &c.

Aceto-Salicylic Acid Elixir.—Messrs. C. J. Hewlett & Son have managed to overcome the insolubility of this compound, and have introduced an elixir containing 3 gr. to a fluid drachm. This is not only an efficient method of prescribing the drug, but a very palatable one. It is not compatible with mineral acids. We congratulate Messrs. Hewlett on this preparation.

Acetosol.—This is a preparation of acetyl-salicylic acid, for which it is claimed that it not only possesses all the properties of salicylic acid in rheumatic affections, but that it has a stimulating rather than a depressing action on the heart. It is put up in 5-gr. palatinoids by Messrs. Oppenheimer, Son & Co., who claim that this is the best mode of administration, as the substance is insoluble in water and in the stomach, and therefore tablets are contra-indicated.

Adrenalin Tablets.—Messrs. Parke, Davis & Co. now supply tablets of adrenalin, each representing $\frac{1}{5}$ gr. One of these dissolved in 17 min. of cold water equals 1-1000 solution. They also supply tablets of adrenalin 1-2000 gr. and eucaine $\frac{1}{5}$ gr. One of these dissolved in 17 min. of water will make a solution suitable for use in dental extraction. One dissolved in 85 min. of water is found sufficient for use in minor operations.

Albargin.—This is a combination of gelatose with nitrate of silver. It is claimed for it that it has neither the irritant action of the silver salts, nor the small solubility and small percentage of silver in the albumin compound. Albargin contains 23.6 per cent of nitrate of silver, and is soluble even in cold water. It is neutral in reaction and dialyses through a normal membrane, and is, moreover, cheaper than the albumin compound. The dilute solutions for immediate use may be made with ordinary water, and the 3-gr. tablets which are supplied are very useful for this purpose. For injections in gonorrhœa and the treatment of wounds 0.1 to 2 per cent solutions are used; for ophthalmic practice, 10 to 20 per cent solutions in glycerin. Messrs. Meister, Lucius & Brüning, 51, St. Mary Axe, E.C., are the manufacturers.

Alypin.—This is monochlorhydrate of benzoyl-1.3-tetramethyl-di-amino-2-ethyl-isopropylalcohol. It is a white crystalline powder, soluble with extraordinary ease in water, and readily in alcohol. Solutions of alypin have a neutral reaction, and may be sterilized without decomposing by boiling for a short time. It is claimed for it that its anæsthetic properties are equal to those of cocaine, that it is less poisonous, and does not produce mydriasis and is less expensive in use. It is manufactured by the Bayer Co., Ltd., 19, St. Dunstan's Hill, London, E.C.

Anæstaform.—This is a local anæsthetic produced by Messrs. Oppenheimer, Son & Co. It contains renaglandin, cocaine, and sulphate of soda. It has been used with success in dental practice, and as a local anæsthetic for surgical operations. It is put up in sealed tubes, each sufficient for one injection, and these cost 5/6 per half-dozen.

Anæsthesin (Ritsert).—This has been largely used as an internal anæsthetic in painful affections of the stomach, such as gastric ulcer, and also by insufflation in cases of catarrh of the nose and throat; in the form of bougies and pessaries for irritable urethral trouble, hyperdiuresis and urethritis; and in the form of suppositories for hæmorrhoidal pains. It has the advantage over cocaine and other local anæsthetics in the *prolonged duration of its anæsthetic action* and its freedom from irritant or toxic properties. This fact is probably due largely to its insoluble character in aqueous fluids, even hot water dissolving very little. It is, however, soluble in 2 and 3 per cent in almond and olive oils, and can be incorporated readily with fatty matter to make ointment and bougies. It is p-amidobenzoic-acid-ester, and appears as a fine white powder. This substance bids fair to have a place of

its own in therapeutics, as no other product quite meets the same indications. Messrs. Meister, Lucius & Brüning, 51, St. Mary Axe, E.C., are the manufacturers.

Anusol.—This is the iodo-resorcin-sulphonate of bismuth. It has a distinctly sedative effect upon all inflammatory surfaces and upon the excessive secretion of wounds. In the form of suppositories it has proved a very useful remedy in the treatment of hæmorrhoids, even when these are of a very chronic character. The anusol suppositories are prepared by Messrs. Reitmeyer & Co., 63, Crutched Friars, E.C.

Aqueous Tinctures.—We have received further samples of the aqueous tinctures made by Messrs. Evans, Gadd & Co., of Exeter. They are absolutely reliable and very economical in use. The cost of the spirit is saved.

Argyrol.—This organic silver compound is growing in favour with the profession, especially in ophthalmic practice. Messrs. Burroughs, Wellcome & Co. have introduced the following preparations of it, which are of great convenience:—A tabloid of $\frac{1}{4}$ gr., which, placed in the conjunctiva, dissolves in a few seconds, and also "soloids" of 1 gr. and 5.45 gr., which, when mixed with distilled water give 10 per cent solutions of either 10 min. or 1 dr. as required.

Arhovin.—This is a by-product of diphenylamin and thymol-benzoic acid. It is recommended as a substitute for sandal oil and balsamics in the treatment of gonorrhœa. It is administered in gelatin capsules. Combined with cocoa-butter it is made into bougies and vaginal globules, so as to obtain its beneficial local action. It is prepared by Messrs. Reitmeyer & Co., 63, Crutched Friars, E.C.

Beef Powder (Andouard's) represents the finest selected beef, deprived of its 80 per cent water, and reduced to powder by Professor Andouard's special process. It contains, integrally, all the nutritive elements of meat—albuminous matter, muscular juice, fat, the mineral and figurative elements of the blood, with the exclusion of all indigestible parts, such as tendons, membranes, etc. The total nutritive principles reach as high as 90 to 92 per cent, as indicated by the following analysis: albuminous matter, 78 to 80 per cent; fatty matter, 8 per cent; mineral salts (phosphates, etc.), 4 per cent; water, 8 to 10 per cent. This nutritive richness surpasses all the known foods, and is at least ten times higher than raw meat in its crude state. We believe that this powder will prove invaluable in cases where there is a difficulty in getting a sufficient amount of nourishment taken, as the dry powder is itself not unpalatable. It is sold by Messrs. E. J. Reid & Co., Dunedin House, Basinghall Avenue, E.C.

Bromoform (Syr. Co.).—In the dispensing of bromoform considerable difficulty is experienced due to its heavy specific gravity. In this preparation the difficulty is overcome by dissolving it in a suitable medium and then incorporating with simple demulcents. In whooping cough it will be found invaluable, diminishing the number, duration, and severity of attacks, and mucous secretion is more easily got rid of. Dose: for children, 1 fl. dr. Messrs. Reynolds & Branson are the manufacturers.

Calcium Chloride (Elixir of).—Chloride of calcium increases the coagulability of the blood, and is said to be almost a specific for those who suffer from chilblains. Its value in tuberculous diseases and in checking hæmoptysis is well established. It is not a pleasant remedy to take, and to obviate this difficulty Messrs. Sumner & Co. have prepared this elixir, which contains 10 gr. to 1 dr. It costs 1/- per lb.

Messrs. Hewlett & Son also produce an excellent elixir of this salt in which the taste is well disguised.

Calcium Iodide (Elixir of).—This has lately been recommended as an excellent remedy for indolent ulcers and as an alternative. The elixir put up by Messrs. R. Sumner & Co. contains 5 gr. to 1 dr.

Cardamomi Aromat. (Mist).—An aromatic and stimulating preparation recommended by Messrs. R. Sumner & Co., of Liverpool, as an excellent vehicle for unpleasant medicines. It gives a nice colour to the mixture.

Cascara Aperient (Compound).—This is a combination of cascara, buckthorn, and senna pods, which is quite palatable and very efficient, without griping. It is well suited for children and cases of habitual constipation. It is made by Messrs. Reynolds & Branson, Leeds.

Castor Oil Powder.—This is a distinctly novel preparation, as it consists of castor oil in the form of a powder. We have tested it clinically, and find that it is taken without that distaste which attends the administration of the oil, and that it is equally efficient. We think this preparation deserves a careful trial at the hands of the profession. It is made by Mr. R. Demuth, 31, Budge Row, E.C.

Cimicifugæ Co. Conc. (Mist).—This is a combination of liq. cimicifuga with aceto-salicylic acid (5 gr. to 1 dr.), and is an excellent remedy in acute rheumatism, sciatica, and lumbago. It is prepared by Messrs. C. J. Hewlett & Son, and represents pharmaceutical skill, as the aceto-salicylic acid is very insoluble.

Cupralgin (Alginoid Copper) is a compound of alginic acid with the metal, the acid itself being obtained from algæ or seaweed. An analogous salt is that known as alginoid iron, a form of iron readily absorbed into the system without giving rise to the disturbances which follow the administration of ordinary iron salts. The success with which alginoid iron has been administered suggested the preparation of alginoid copper, or alginate of copper, as a form of organic copper salt which would readily introduce copper into the blood and assist its germ-resisting power under certain conditions. Alginoid copper is a green powder, and contains the equivalent of 19 per cent of copper oxide. It is administered in the form of gelatin-coated pills, each containing one-twelfth of a grain of the alginate. It has been successfully employed in cases of lupus and also for tuberculous ulceration of the bowels, and dysentery. It appears that alginoid copper is analogous in composition to the copper salt found in certain animals which serves the place of iron in the higher animals. Alginoid copper is well assimilated by the protoplasm of the cells, and as an internal antiseptic has been found of considerable value in chronic cases which do not generally yield to treatment. It is prepared by Messrs. Evans, Sons, Lescher & Webb, 60, Bartholomew Close, E.C.

Cyllin.—This disinfectant, which is familiar to the profession under the name of Jeyes' Fluid, has undergone recent improvement in a fluid which the Company call "Medical Cyllin." This has been so perfected that its carbolic co-efficient is now equal to perchloride of mercury—this when tested against a vigorous culture of *B. typhosus*. When it is remembered that this preparation is guaranteed to be ten times less toxic than carbolic acid, it will be seen what a valuable germicide it is, and how difficult it will be for any of the newer preparations to displace it.

The Company have also brought out a "Cyllin Syrup" for internal use. This is not unpalatable, and has given excellent results as an intestinal antiseptic. Even 5-drop doses of the syrup have proved efficacious in infantile diarrhœa, and a dose of 10 drops is sufficient for most cases. It is distinctly a remedy which should be borne in mind in all cases where an intestinal antiseptic is necessary.

Dymal.—This is a dusting powder for wounds, and consists of didym-salicylate, which occurs as a by-product in the manufacture of incandescent mantles. It takes the form of a white impalpable powder which adheres closely to the skin, is non-irritant, non-poisonous, and antiseptic. It answers its purpose well, and is economical in use. Messrs. Zimmer & Co., 33, Line Street, E.C., are the manufacturers.

Emplastrum-Antiseptic Liq.—This is a transparent coating for small wounds and abrasions, and is so useful for the purpose that the practitioner should never be without it in his bag. It requires no bandage or plaster, and renders the wound hardly noticeable. For small wounds and abrasions of the hands and face it is invaluable. It is prepared by Messrs. R. Sumner & Co., of Liverpool.

Ergot.—*Ergosol* is the name given by Messrs. Ferris & Co., of Bristol, to a standardized preparation of liq. ext. ergot. Each bottle contains a label showing the increase of blood-pressure caused by the sample of ergosol contained therein. It is a reliable preparation, and costs very little more than the ordinary liq. extract.

Ernutin is a name given to a preparation containing the active principles of ergot by Messrs. Burroughs, Wellcome & Co. It is issued in sealed glass phials, sterilized, and is thus well suited for hypodermic injection. Five min. is regarded as the best initial dose for hypodermic use. The dose by the mouth is 30 to 60 min.

Eucaine Lactate.—Of the salts of eucaine, the lactate is the most generally useful. In anæsthetic power it is equal to cocaine salts, but is non-toxic, non-irritating, and does not constrict the blood-vessels or dilate the pupil. It is extremely soluble, twenty per cent solutions being readily made with cold water. The stability of its solutions is such that they may be sterilized by boiling without undergoing decomposition.

Two per cent solutions are used for ophthalmic purposes, and for laryngoscopy and rhinoscopy; 4 to 8 per cent for the nose previous to the use of the galvano-cautery; 6 to 8 per cent for removal of tonsils; and 2 to 4 per cent for catheterization and for endoscopic examinations. In dental work 2 per cent solutions are commonly used. In general surgery eucaine is used as a local anæsthetic by hypodermic injection of 4 per cent solutions. Though the strengths of solution here indicated are those commonly employed, yet on occasion 20 per cent, and even much stronger, may be desirable.

Messrs. Burroughs, Wellcome & Co. prepare the following preparations, which are convenient for use: "Tabloid" Hypodermic Eucaine Lactate, $\frac{1}{2}$ gr. (0.022 gram) and 1 gr. (0.065 gram) in tubes of 20; "Soloid" Eucaine Lactate, 1 gr. (0.065 gram) and 5 gr. (0.324 gram) in bottles of 25.

Euquinine is the carbonic-acid-ethyl-ester of quinine. It has found its chief use in the treatment of malaria, producing its therapeutic effects without toxic symptoms. It was also used largely during the severe epidemic of typhoid in Fiume (Hungary) with satisfactory results, and has been specially recommended for use in the treatment of children. It is manufactured by Messrs. Zimmer & Co., 33, Lime Street, E.C.

Flammadene (Ferris).—This is a paste, highly hygroscopic, which, when applied to an inflamed or congested skin, reduces heat, swelling, and pain. It can be used with very great advantage in pleurisy, pneumonia, peritonitis, glandular swellings, effusion of joints, and edema of limbs. The value of such applications is well recognized, but the cost has limited their use; we are glad, therefore, to see that Messrs. Ferris & Co. have introduced this product at a cost which brings it within reach of all patients.

Formamint Tablets.—Formamint is a chemical combination of formic aldehyde with lactose. It is, in its pure state, absolutely free from the penetrating odour of formic aldehyde, and has none of the irritating action of the ordinary solutions of this substance, whilst its chief virtue consists in the ease with which the formic aldehyde becomes liberated in the organism. This liberation takes place in the mouth at once by the action of the saliva. It follows, therefore, that when formamint is made into tablets, and these are allowed to dissolve slowly in the mouth, it forms a powerful antiseptic and germicide which no ordinary gargle or mouth-wash can equal, besides being much more convenient. Formamint appears to be quite uninjurious,

even in large doses, and we might suggest that the practitioner himself would do well to put one in his mouth before examining a diphtheritic throat or other infectious disease, in addition to prescribing them for the patient. We regard these tablets as a distinct addition to our resources. They are prepared by Messrs. A. Wulff & Co., 83, Upper Thames Street. E.C.

Formates and Formic Acid.—Formate of soda has lately been largely used to increase muscular energy and remove the sense of fatigue. It is said also to be valuable in paralysis agitans and chorea, also to diminish the quantity of albumin in the urine. An elixir, prepared by Messrs. R. Sumner & Co., containing $2\frac{1}{2}$ gr. to each fluid drachm. forms a suitable mode of administration.

Another way of prescribing the formate of soda has been introduced by Messrs. Reynolds & Branson, of Leeds, who combine it with their well-known preparation of the *Glycero-Phosphates*. This is an excellent tonic in cases of neurasthenia.

They also prepare an *Elixir of Formates of Soda and Calcium* which is pleasant to take and gives excellent results, and an *Elixir of Formic Acid*, as some physicians prefer its administration in this form.

Formatis (Syr.) (Setterie).—This is made in accordance with the original formula used by Prof. Huchard, of Paris. It is the only preparation of its kind containing the formate of iron and quinine. In France it has largely taken the place of the hypophosphites, as the formates give a great stimulus to functional energy. It is supplied by the British Pharmacal Co., 155, Marlborough Road, Holloway, N.

Fruitarian Diet.—The value of nuts as a food and as a substitute for meat has led to considerable attention being given to their preparation in a palatable and easily digestible form. Under the name of "Nutton" a product has been manufactured entirely from nuts, which bears a resemblance in taste and appearance to potted meat. A comparative analysis of nutton and beef gives the following results: Average analysis of nutton, albuminoids 20.034, sugar 2.140, fat 11.000, carbohydrates 10.073, waste matter 1.998, mineral matter, salts, etc. 1.503, water 53.252; average analysis of beef, albuminoids 19.0, sugar nil, fat 10.0, carbohydrates nil, waste matter 9.0, mineral matter, salts, etc. 1.0, water 61.0. It will be seen, therefore, that while beef shows about 30 per cent of nutriment, nutton gives 45 per cent, and, apart from this, is a non-uric-acid-producing food. We strongly advise our readers to try samples of nutton, and also other preparations of nuts and fruits made by Mr. R. Winter, City Arcade, Birmingham, whose catalogue is interesting. We regret we cannot give space to a further description of these preparations.

Gargarisma Boraldehyde Concentrated.—This, when diluted with seven parts of water, forms a gargle consisting of 1 per cent boric acid and 1-2000 formaldehyde. It has been found most useful in diphtheritic or septic throats. Messrs. R. Sumner & Co., of Liverpool, are the manufacturers.

Gelatinum Acidi Borici et Zinci.—This is prepared by Messrs. R. Sumner & Co. in sheets, so that it is only necessary to cut off a sufficient quantity for each application. This is placed in a pot or suitable vessel, which is allowed to stand in hot water until the gelatin is melted, when it is applied with a brush. This is more convenient than having to dig the gelatin out of the pot before melting. We have used this with great satisfaction.

Genoform.—This is a salicylated methylene acetate, and is valuable in the same class of cases as the salicylate. It is put up in tablets, which are sold in tubes of 10 or 20, and is claimed to produce its effects more rapidly than salicylic acid and its salts. It is sold by Messrs. E. J. Reid & Co., Dunedin House, Basinghall Avenue, E.C.

Hæmorrhaline.—This consists of acetate of lead, distilled witch hazel, morphine (in the same proportion as contained in ung. gallæ. c. opio, B.P.) with lanolin. It is specially recommended for the treatment of hæmorrhoids, both internal and external, as it relieves the pain and stays the bleeding in

most cases. It is supplied in collapsible tubes, each with vulcanite rectal pipe in box, 10/- per doz. ; in bulk, 3/- per lb., by Messrs. C. J. Hewlett & Son, 33-42, Charlotte Street, E.C.

Hypnogen.—This is di-ethyl-barbituric acid, a substance very sparingly soluble in water, which has very excellent properties when used as a hypnotic. Messrs. Oppenheimer, Son & Co. prepare it in the form of 5 gr. palatinoids, one to three of which constitute a dose.

Isoform.—A name given to para-iodoanisol. It appears as a colourless powder having a slight anise-like odour. It is soluble in water with difficulty, and practically insoluble in alcohol, ether, etc., and may be heated in the dry state to about 200° C. without decomposition. According to all present experience it is non-toxic both as regards external employment and also for internal administration in doses of 8 to 30 gr. daily. It is employed as a dusting powder for wounds, and as a gauze for dressings. A paste is also made with equal parts of glycerin, which may be used to sterilize the hands. Capsules containing 8 gr. for intestinal antiseptic are also prepared. Messrs. Meister, Lucius & Brünig, St. Mary Axe, E.C., are the manufacturers.

Isson.—A name given to a preparation of the saccharated protoxide of iron, which closely resembles the iron in the blood. It has been used in cases of anæmia and debility with the happiest results. It is prepared by E. J. Reid & Co., Dunedin House, Basinghall Avenue, E.C.

Kephalgin and Heroin Tablets.—Messrs. Ferris & Co. have added heroin $\frac{1}{12}$ gr. to their well-known kephalgin tablets. We have used these tablets with remarkably good results and can highly recommend them. The addition of heroin aids their action immensely.

Kerol.—This is a coal-tar preparation, but contains no carbolic nor cresylic acids. Its active principle is an oxygenated diphenyl compound, far less toxic and irritant than carbolic acid. Numerous bacteriological tests have been applied, and its makers guarantee that its carbolic acid co-efficient is not less than 14 when tested against *B. typhosus*. A 1-per-cent solution will kill anthrax spores in less than sixty minutes. Having regard to the fact that its disinfectant and bactericidal powers are proved to be from 10 to 30 times more powerful than carbolic acid, and that it is economical in use, we can predict a great future for kerol. It is the production of Messrs. Quibell, Bros., Ltd., Newark.

Krephen.—This is a specially prepared form of the well known "Universal Disinfectant," prepared by Messrs. Ferris & Co., of Bristol. It is intended for medical and surgical use. It is readily miscible with water, non-poisonous and non-irritant, and does not stain or burn. It can be obtained in $\frac{1}{2}$ -gallon tins at 5/-. This germicide deserves an extended trial in surgical practice.

Kresapol.—A combination of cresylic acid with a pure potash soap. Being miscible with water in all proportions, it has a great advantage over carbolic acid. It is claimed to possess greater bactericidal properties, while being less toxic. It is an excellent antiseptic and deodorant, and is not costly. Half-gallon tins can be obtained at 4/- each from Messrs. Ferris & Co., of Bristol, who are the manufacturers.

Laxative Fruit Pastilles.—Messrs. Burroughs, Wellcome & Co. have manufactured some pastilles which present an efficient laxative in an exceptionally agreeable form, and possess distinct advantages over other aperient preparations. Each pastille contains 5 gr. of extract of senna fruit in a suitable and pleasantly flavoured gelatine basis. The extract of senna fruit produces a gentle laxative effect without the griping and other discomfort associated with the administration of preparations of senna leaves. As the aperient principle is excreted by the mammary gland, "Tabloid" Laxative Fruit may be given to a nursing mother in order that its effect may be exercised upon the infant. One may be dissolved slowly in the mouth and repeated as necessary.

Linimentum Analgesicum.—This is a combination of oil of wintergreen (methyl salicylate) with camphor, menthol, etc., of great value in the external treatment of rheumatism, sciatica, lumbago, etc. Lin. analgesicum is specially indicated in cases where the internal administration of salicylates causes derangements of the stomach and heart, and where it is desirable to apply salicylates directly to the diseased part, as the liniment is readily absorbed by the skin. It is prepared by Messrs. Ferris & Co., of Bristol, and costs 3/- per lb.

Linimentum Methyl Salicylate Co.—This is a combination of methyl salicylate and camphor which makes an excellent application in rheumatism, sciatica, lumbago, etc. It is prepared by Messrs. R. Sumner & Co., Liverpool. We have used it in hospital practice with most satisfactory results.

Mentharenal.—Under this name Mr. Frank A. Rogers, 327, Oxford Street, W., has introduced a preparation containing the active principle of the suprarenal gland, as a spray for hay fever, coryza, etc. It may be used as it is, or diluted with water. Its results in our hands have been most satisfactory.

Menthol and Methyl Salicylate Cream.—This is a powerful anæsthetic ointment useful in rheumatism, neuralgia, etc., which Messrs. Sumner & Co. dispense in collapsible tubes.

Methosal.—This is a combination of salicylate of methyl with menthol and counter-irritants. It is produced by Messrs. Ferris & Co., of Bristol, and is used as an application in rheumatism, arthritis, and sciatica: it is more powerful than "Lin. Analgesicum."

Muiracithin.—This is a combination of an extract of muira-puama, a Brazilian drug, and lecithin. Used as a remedy for functional impotence, it has yielded good results in the sexual weakness due to neurasthenia. The muira-puama is an aphrodisiac, and the lecithin, prepared from yolk of eggs, removes the neurasthenic condition. The results have been very satisfactory. Messrs. Reitmeyer & Co. are the British agents.

Muscatol.—This is the name give by Mr. Frank A. Rogers, of 327, Oxford Street, W., to a non-poisonous and non-greasy "insect specific." In other words it will prevent the bite of mosquitoes, gnats, and garden midges. It has been used very extensively in all parts of the world with uniformly successful results, and many of our medical friends take it with them on their holidays. Some of our readers may be glad to know of this, because insect bites on a holiday are only a degree less troublesome than patients!

Novocain.—This is one of the best local anæsthetics that have yet been produced. It is a derivative of the new class of amino alcohols. It appears as a white crystalline powder, which can be heated without decomposition to a temperature of 120° C. It dissolves readily in cold water. The aqueous solutions are neutral in reaction and can be boiled without decomposition or change. In use it does not produce local irritation, is six times less toxic than cocaine, and does not cause mydriasis when applied to the eye. It does not reduce the action of suprarenin, but, on the contrary, increases it. This essential requirement has never been complied with by any of the cocaine substitutes introduced before novocain. It is sold in powder form, in tablets combined with suprarenin borate, and also in sterilized solutions of the same combination. It has been extensively employed in various continental hospitals, and all the reports are warm in its praise. We can strongly recommend the substance, and also commend the way in which it is put up for use by the Saccharin Corporation, Ltd., 165, Queen Victoria Street, E.C.

Ophthalmic Tablets.—These contain boric acid 6 gr., zinc sulph. $\frac{1}{2}$ gr., otto of rose q.s. One dissolved in one or two tablespoonfuls of water makes an efficient eye lotion. They are prepared by Messrs. R. Sumner & Co., Liverpool.

Palatinoids and Ethics.—Messrs. Oppenheimer, Son & Co., remind us that they only supply their palatinoids in stock bottles, so that the chemist may dispense them to his own customers and label them in the ordinary way. They consider that this prevents self-medication and the abuse of the physician's prescriptions. We entirely agree with them, but unfortunately the public of the present day are clever at reading prescriptions, and have acquired so much information about the action of drugs that the abuse of prescriptions is difficult to prevent. None the less we commend Messrs. Oppenheimer for the stand they have taken in the matter. They deserve every encouragement at the hands of the profession.

Pancreopepsine.—Liquid pancreopepsine is manufactured by Messrs. Wm. R. Warner & Co., combining in an agreeable form the natural and assimilative principles of the digestive fluids of the stomach and duodenum, comprising pancreatin, pepsin, lactic and muriatic acids, etc. It is an excellent aid to digestion. Messrs. F. Newbery & Sons, Ltd., 27 and 28, Charterhouse Square, E.C., are the agents.

Pastille Benzoic Acid Comp.—These contain benzoic acid, codeine, menthol, P. ipecacuanha, cocaine hydrochloride, and red gum, and form a pleasant, palatable, and convenient means of obtaining the local action on the throat of stimulating, antiseptic, expectorant, and anodyne principles. They are of value in the pain and irritating cough associated with varieties of pharyngitis, smoker's throat, and clergyman's sore throat. They are prepared by Messrs. Burroughs, Wellcome & Co.

Pectoral Pastilles.—Messrs. Burroughs, Wellcome & Co. supply "Tabloid" pectoral pastilles which contain ammoniated liquorice, squill, tolu, senega, ipecacuanha, wild cherry, etc. They afford a palatable and convenient means of exhibiting aromatic, expectorant, demulcent, and sedative principles. Slowly dissolved in the mouth, these pastilles exert a prolonged and uniform effect on the respiratory tract. They relieve cough, check excessive secretion, and soothe the irritated mucous membrane.

Pegnin.—This is used to coagulate milk and render it more digestible for infants and invalids. We have no particulars of the nature of "Pegnin," which is a trade-mark name, but, being prepared by Messrs. Meister, Lucius and Brüning, 51, St. Mary Axe, E.C., we presume it is reliable.

Pellanthum.—Last year we reported favourably on this application for the skin, prepared by Messrs. Handford & Dawson, of Harrogate. We have now received a further sample put up in combination with suprarenalin, which the manufacturers claim has been found efficient in some severe cases of eczema.

Perderma (Reiss).—This contains, as its basis, a superfatted soap, with which is incorporated 10 per cent of free salicylic acid in addition to 10 per cent of salicylic esters with benzoyl and phenyl radicals. Hence *perderma* exercises an energetic and powerful penetrating action, and has given excellent results in cellulitis, chilblains, mastitis, tylosis, pityriasis, and psoriasis. It is also prepared in combination with tar and chrysarobin, or the two combined. Messrs. Chas. Zimmermann & Co., 9 & 10, St. Mary-at-Hill, E.C., are the agents.

Phthisis Capsules.—A capsule with the following ingredients has been prepared by Messrs. R. Sumner & Co., of Liverpool, at the suggestion of a physician: Cod-liver oil 20 min., albumin 20 gr., diastase equivalent to 2 dr. of extract of malt, beechwood creosote 2 min. These have given very satisfactory results, and there is a large demand for them.

Probilin.—This is a combination of salicylic acid, the action of which as a biliary antiseptic is enforced by the addition of acid sodium oleate, menthol, and phenolphthalein. It has proved useful in liver trouble, by encouraging the flow of bile and promoting the elimination of gall-stones. It is prepared in the form of pills by Messrs. Reitmeyer & Co., 63, Crutched Friars, E.C.

Pyramidon.—This is a white powder, without odour and almost tasteless. It is in principle similar to antipyrine. Certain quantitative differences are, however, observed which makes pyramidon a more valuable substance therapeutically than antipyrine. On human subjects pyramidon has three or four times the antipyretic effect of antipyrine. The dosage is therefore smaller: for adults 5 to 8 gr. suffice, and it is no doubt partly in consequence of the smaller dose that no disturbances of the stomach and intestines are observed. Its effects are more lasting, and no bad results have so far attended its use. Messrs. Meister, Lucius & Brünig are the manufacturers.

Pyrenol.—A chemical compound of salicylic acid, benzoic acid, and thymol. In diseases of the respiratory organs, as the different forms of asthma, bronchitis, and pertussis, it is a quickly-acting expectorant and antispasmodic. In influenza, pneumonia, and typhoid it is equally useful as a harmless febrifuge and heart stimulant. In rheumatism and the neuralgias it acts as a prompt and powerful sedative and analgesic, violent pain ceasing in thirty minutes. In cardiac neuroses it sustains blood pressure and removes the distressing symptoms. It is given in doses of $7\frac{1}{2}$ –15 gr., and is prepared by Messrs. Reitmeyer & Co., 63, Crutched Friars, E.C.

Pyrilin.—This is the ethyl phosphate of pyridin. Pyridin, in its medicinal and curative properties allied to benzoin, creosote, and tar products, was introduced by Prof. Sec, of Paris, in a communication to the Academy of Medicine as a remedy of great value in asthma. It is also found of considerable service in phthisis, but its persistent disagreeable odour prevented its general adoption. The special preparation, "Pyrilin," possesses the beneficial properties of pyridin, whilst it is presented in an attractive and agreeable form, so combined that, whilst it destroys the bacilli, absorbs tubercle and allays irritation and inflammation; it subdues cough and soothes the nervous system; it also checks night perspirations and improves the appetite. It is manufactured by Messrs. Lorimer & Co., Ltd., Britannia Row, Islington, W.

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Suprarenin.—This is prepared as suprarenum hydrochloricum and suprarenum boricum. They are both stable solutions, and the 1-1000 solution can be diluted 5 or 10 times with physiological salt solution and still remain remarkably effective. These are excellent preparations of the active substance of the adrenals, and can be relied upon. They are prepared by Messrs. Meister, Lucius & Brüning, of St. Mary Axe, E.C.

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Trigemin.—This occurs in long white needles, resulting from the action of chloral hydrate on pyramidon. It is very soluble in water and is well tolerated by the stomach. It has been employed with great success as an analgesic in cases of neuralgia, headache, and migraine. Usually a dose of 10 to 12 grains repeated three or four times a day is sufficient, even in severe cases. It has no hypnotic action and does not depress the heart. Messrs. Meister, Lucius & Brüning, 51, St. Mary Axe, E.C., are the manufacturers.

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- Belfast.—*Belfast District Lunatic Asylum*. Res. Med. Supt., Wm. Graham, M.D. Access—Belfast.
- Beverley.—*East Riding County Asylum*. Res. Med. Supt., Dr. M. A. Archdale. Access—Beverley, 2 miles.
- Birmingham.—*Birmingham City Asylum*, Rubery Hill, near Birmingham. Res. Med. Supt., A. C. Suffern, M.D. Access—Rubery station.
Birmingham City Asylum, Winson Green. Res. Med. Supt., E. B. Whitcombe. Access—Winson Green, $\frac{1}{2}$ mile; Soho, $\frac{1}{4}$ mile.
- Bodmin.—*Cornwall County Asylum*. Res. Med. Supt., Dr. Hy. A. Layton.
- Box (Wilts).—*Kingsdown House*, 5 miles from Bath. Res. Med. Supt., Dr. H. C. MacBryan. Access—Box. See also p. 807
- Brentwood.—*Essex County Asylum*. Res. Med. Supt., Dr. G. Amsden. Access—Brentwood station, $\frac{1}{2}$ mile.
- Bridgend.—*Glamorgan County Asylum*. Res. Med. Supt., D. Finlay. M.D. Access—Bridgend, $1\frac{1}{2}$ miles.
- Bristol.—*Brislington House*. Proprietress, Mrs. Bonville Fox. Res. Med. Supt., Dr. W. B. Morton. Asst. Med. Officer, G. H. Rains. Access—Bristol 3 miles.

- City and County Asylum*, Fishponds. Res. Med. Supt., J. Vincent Blachford, M.D. Clerk, Arthur Orme. Access—Fishponds station, 1 mile.
- Northwoods House*, Winterbourne 7 miles from Bristol. Res. Med. Props., Reginald Eager, M.D., and Mr. W. Eager, L.R.C.P., M.R.C.S. Access—Cab from Bristol, or from Fishponds, Winterbourne, or Patchway stations. See also p. 810
- Burgess Hill (Sussex)*.—*St. George's Retreat*. Med. Off., Dr. John A. Cones. Access—Burgess Hill stat.
- Buxton*.—*Wye House*. Res. Phys., F. K. Dickson, F.R.C.P. & S., and T. G. Dickson, L.R.C.P. & S. Access—Buxton. See also p. 801
- Cambridge*.—*County Asylum*, Fulbourn. Res. Med. Supt., E. C. Rogers, M.R.C.S. Access—Cambridge station, $3\frac{1}{2}$ miles.
- Canterbury*.—*Stone House*, St. Martin's. Res. Med. Supt., Dr. N. Lavers.
- Carlisle*.—*County Asylum*. Res. Med. Supt., W. F. Farquharson, M.D. Access—Carlisle, 3 miles.
- Carlow*.—*District Asylum*. Res. Med. Supt., Dr. J. J. Fitz-Gerald. Access—Carlow, $\frac{1}{4}$ mile.
- Carmarthen*.—*Joint Counties Asylum*. Res. Med. Supt., ——. Access—Carmarthen, 2 miles.
- Castlebar (Co. Mayo)*.—*District Asylum*. Res. Med. Supt., Dr. G. W. Hatchell. Access—Castlebar, 1 mile.
- Chartham (near Canterbury)*.—*Kent County Asylum*. Res. Med. Supt., G. C. Fitzgerald, M.D. Access—Chartham station, 1 mile.
- Cheadle*.—*Manchester Royal Lunatic Hospital*. Res. Med. Supt., W. Scowcroft, L.R.C.P., M.R.C.S. Access—Cheadle, 2 miles.
- Chester*.—*Cheshire County Asylum*. Res. Med. Supt., A. Lawrence, M.D. Station, $1\frac{1}{2}$ miles.
- Chichester*.—*West Sussex County Asylum (Graylingwell Hospital)*. Res. Med. Supt., Dr. H. A. Kidd. Access—Chichester station, $1\frac{1}{2}$ miles.
- Church Stretton*.—*Stretton House*, Shropshire (for gentlemen). Res. Med. Prop., Horatio Barnett, M.B. Access—Church Stretton station, $\frac{1}{2}$ mile. See also p. 800
- The Grove House* (for ladies). Res. Prop., Mrs. McIntock. Res. Med. Supt., Dr. McIntock. See also p. 802
- Clonmel*.—*District Asylum*. Res. Med. Supt., Dr. Bagenal C. Harvey. Access—Clonmel, 1 mile.
- Colchester*.—*Eastern Counties Imbecile Asylum*. Res. Supt. and Sec., John J. C. Turner. Access—Colchester.
- Cork*.—*District Asylum*. Accommodation for 1,300 patients. Res. Med. Supt., Dr. James Cashman. Access—Cork, 2 miles.
- Cupar (Fifeshire)*.—*Fife and Kinross District Asylum*. Res. Med. Supt., A. R. Turnbull, M.B. Access—Springfield station.
- Darlington (Durham)*.—*Dinsdale Park*. Res. Med. Supt., H. W. Kershaw, M.R.C.S. Access—Darlington, 5 miles; Dinsdale, 1 mile. See also p. 808
- Middleton Hall*, Middleton St. George, Co. Durham. Res. Licen. and Med. Supt., L. Harris-Liston, M.D. Access—Dinsdale station, 1 mile. See also p. 802
- Dartford*.—*City of London Asylum*, near Dartford. Res. Med. Supt., Dr. R. H. Steen. Access—S.E.R. Dartford, $1\frac{1}{2}$ miles.
- Denbigh (N. Wales)*.—*North Wales Counties Asylum*. Med. Supt., Dr. Llewelyn F. Cox. Access—Denbigh, 1 mile.
- Derby*.—*Borough Asylum, Rowditch*. Res. Med. Supt., Dr. Macphail. Access—G.N.R. station, 1 mile; M.R. 2 miles. See also p. 803
- County Asylum*, Mickleover. Res. Med. Supt., R. Legge, M.D. Access—Derby, M.R. 5 miles; Mickleover, G.N.R. 2 miles.
- Devizes*.—*Wilts County Asylum*. Res. Med. Supt., J. I. Bowes, M.R.C.S. Access—Devizes, 1 mile.
- Dorchester*.—*The County Asylum, "Herrison"*. Med. Supt., P. W. Macdonald, M.D. Access—Dorchester, 3 miles.
- Downpatrick*.—*District Asylum* (for 800 patients). Res. Med. Supt., M. J. Nolan, L.R.C.P.I. & L.M. Access—Downpatrick, 1 mile.

Drumcondra (Co. Dublin).—*Hartfield House*. Med. Prop., Dr. F. E. Lynch. Vis. Phys., Dr. Matthew Burke Savage. Access—Dublin, 2 miles.

Dublin.—*Bloomfield*, Morehampton Road. Med. Officer, H. T. Bewley, M.D. Access—Dublin, 1 mile.

Farnham House and Maryville, Finglas (for 56 patients, both sexes). Prop. and Res. Med. Supt., W. R. Dawson, M.D. Access—Cab from Dublin, 3 miles.

Consulting Rooms, 41, Upper Fitzwilliam Street, Dublin. Telephone No. 1470.

Highfield (for ladies), Drumcondra. *Hampstead* (for gentlemen), Glasnevin. Res. Med. Supts., Hy. M. Eustace, B.A., M.D., and Dr. Wm. N. Eustace. Access—By rail, Dublin. See also p. 815

House of St. John of God, Stillorgan. Res. Phys., Dr. P. O'Connell. Access—Stillorgan station, $\frac{1}{2}$ mile; Dublin, 5 miles.

Richmond District Asylum. Res. Med. Supt., Dr. C. Norman.

St. Patrick's Hospital, James Street. Res. Med. Supt., Dr. R. A. Leeper. Assist. Med. Off., Dr. Rutherford. St. Edmundsbury. Branch at Lucan. Asst. Med. Off., Dr. A. Burrell.

St. Vincent's Asylum, Fairview. Vis. Med. Supts., Sir Francis R. Cruise, D.L., M.D., and John Murphy, F.R.C.P.I. Apply to the Superioress.

Stewart Institution, Palmerston, Chapelizod. Res. Med. Supt., F. E. Rainsford, M.D. Access—Kingsbridge station, $2\frac{1}{2}$ miles.

Verville, Clontarf, near Dublin. Med. Prop., Dr. F. E. Lynch. Vis. Phys., Dr. M. B. Savage. Access—Dublin.

Woodbine Lodge, Rathfarnham, 6 miles (ladies). Prop., Mrs. Bishop. Med. Supt., Dr. A. Croly. Access—Rathfarnham tram, 2 miles.

Dudley (Stafford).—*Ashwood House*, Kingswinford. Props. Drs. Peacock and Pietersen. Res. Med. Supt., Dr. Pietersen. Access—Stourbridge Junc. $3\frac{1}{2}$ miles, Dudley station, 4 miles; Wolverhampton, 7 miles. See also p. 813

Dumfries.—*Crichton Royal Institution*. Med. Supt., J. Rutherford, M.D. Access—Dumfries, 1 mile.

Dundee.—*Royal Asylum and District Asylum*. Liff. Res. Med. Supt., W. Tuach-Mackenzie, M.D. Access—Dundee, 3 miles; Liff, $1\frac{1}{2}$ miles.

Durham.—*County Asylum*, Winterton. Res. Med. Supt., Dr. W. St. J. Skeen, M.B. Access—Sedgefield station, 3 miles, by 'bus.

Earlswood.—*Training Home for the Feeble-minded and Imbecile* (Males 400, females 200). Res. Med. Supt., Dr. Charles Caldecott. Sec., H. Howard, 36 King William St., E.C. Tel. No. 7684 Lon. Wall. Access—Earlswood station or Red Hill Junc., $1\frac{1}{2}$ miles. See also p. 812

Edinburgh.—*Mavisbank House*, Polton, Midlothian. Res. Med. Supt., —. Access—Polton station, N.B.R., 5 minutes' walk.

Midlothian and Peebles District Asylum (Patients, 350). Res. Med. Supt., R. B. Mitchell, M.D. Access—Rosslynlee station, 1 mile.

Royal Edinburgh Asylum, Morningside. Res. Phys. Supt., T. S. Clouston, M.D. Access—Edinburgh, $1\frac{1}{2}$ miles.

New Saughton Hall, Polton. Med. Supt. J. B. Tuke, M.D. Access—Princes Street station, 20 minutes.

Elgin.—*District Asylum*. Res. Supt., Alexander Hendry. Vis. Med. Off., Dr. D. G. Campbell. Access—Elgin, $1\frac{1}{2}$ mile.

Ennis.—*District Asylum*. Res. Med. Supt., Dr. F. O'Mara. Access—Ennis station, 2 miles.

Enniscorthy (Co. Wexford).—*District Lunatic Asylum*. Res. Med. Supt., Thos. Drapes, M.B. Access—Enniscorthy, 1 mile.

Epsom (Surrey).—*The Silver Birches*, Church Street (for ladies). Res. Licensee, Miss Daniel. Co-Licensee, Dr. E. C. Daniel. Access—L. & S.W.R., and L.B.S.C.R., 5 minutes. See also p. 809

Exeter.—*City Asylum*, Heavitree. Res. Med. Supt., R. L. Rutherford, M.D. Access—Exeter, 4 miles.

Court Hall, Kenton, near Exeter. Res. Licensees, Miss Mules, M.B. B.S., and Miss A. S. Mules. Vis. Phys., Dr. Lovely. Access—Starcross, 1 mile. See also p. 809

Devon County Asylum, Exminster. Med. Supt., Dr. Arthur N. Davis. Access—Exminster, $1\frac{1}{4}$ miles; Exeter, 4 miles.

Wonford House (Hospital for the Insane). Res. Med. Supt., P. Maury Deas, M.B., M.S. Lond. Access—Exeter station (Queen Street) $1\frac{1}{2}$ miles; (St. David's), 2 miles.

See also p. 814

Fairford (Gloucestershire).—*Fairford Retreat*. Res. Med. Prop., Dr. A. C. King-Turner. Access—Fairford.

Glasgow.—*District Asylum*, Woodilee. Med. Supt., Hamilton C. Marr, M.D. Access—Lenzie station, 1 mile; Glasgow, 8 miles.

District Asylum and Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Access—Garnkirk station.

Govan District Asylum, Hawkhead. Res. Med. Supt., Dr. W. R. Watson. Access—Crookston station.

Kirklands Asylum, Bothwell. Res. Med. Supt., James H. Skeen, M.B. Access—Bothwell and Fall-side stations, $\frac{1}{2}$ mile; Glasgow, 9 miles.

Lanark County Asylum. Med. Supt., Dr. N. T. Kerr. Access—Hartwood, 5 minutes.

Royal Asylum, Gartnavel. Res. Phys. Supt., Landel R. Oswald, M.B. Private patients only.

Smithston Asylum, Greenock. Med. Off., Jas. Laurie, M.B. Access—Greenock, about $1\frac{1}{2}$ miles.

Gloucester.—*Barnwood House*. Res. Med. Supt., J. G. Soutar, M.B., C.M. Access—Gloucester, 2 miles.

See also p. 811

Gloucester County Asylums, Wotton and Barnwood, Gloucester. Res. Med. Supt., F. Hurst Craddock, M.A., Oxon., M.R.C.S. Access—Gloucester station, 1 mile.

Great Yarmouth.—*Royal Naval Hospital*. Fleet Surgeon in charge. Access—Great Yarmouth station, 1 mile. For Naval patients only, admitted by Admiralty order.

Guernsey.—*St. Peter Port Asylum*. Med. Off., E. K. Corbin, M.R.C.S.

Haddington.—*District Asylum*. 17 miles from Edinburgh. Med. Supt., J. Bruce-Ronaldson, M.D. Access—Haddington station, 10 minutes.

Hatton (near Warwick).—*County Asylum*. Res. Med. Supt., A. Miller, M.B. Access—Hatton station, 2 miles; Warwick, 3 miles.

Hayward's Heath.—*Brighton County Borough Asylum*. Res. Med. Supt., Edward B. C. Walker, M.D. Access—Hayward's Heath, $1\frac{1}{2}$ miles.

Hellingly.—*East Sussex County Asylum*. Res. Med. Supt., F. R. P. Taylor, M.D.

Henley-in-Arden (Warwickshire).—*Glendossil* (for both sexes). Res. Prop., Dr. S. H. Agar. Access—Henley-in-Arden, G.W.R., $\frac{1}{2}$ mile.

Hereford.—*County and City Asylum*. Res. Med. Supt., C. S. Morrison, L.R.C.P. Ed. Access—Barrs Court, Hereford, 3 miles.

Hitchin (Herts), near.—*Three Counties Asylum*. Res. Med. Supt., S. E. de Lisle, L.R.C.P.I. Access—Three Counties station, 1 mile.

Hull.—*City Asylum*. Res. Med. Supt., J. Merson, M.D. Access—Willerby station, 1 mile.

Inverness.—*District Asylum*. Med. Supt., R. B. Campbell, M.B. Access—Inverness, $2\frac{1}{2}$ miles.

Ipswich.—*Borough Asylum*. Med. Supt., Dr. E. L. Rowe. Access—Ipswich, 2 miles.

Isle of Man.—*Lunatic Asylum*, Union Mills. Med. Supt., W. Richardson, M.D. Access—Douglas, 3 miles.

Isle of Wight.—*The County Asylum*, Carisbrooke. Res. Med. Supt., Harold Shaw, M.B. Access—Blackwater, $\frac{3}{4}$ mile; Newport, $2\frac{1}{2}$ miles.

Isleworth (Middlesex).—*Wyke House*. Res. Prop., Dr. F. Murchison. Access—Isleworth, Brentford, Osterley station, 1 mile.

Ivybridge.—*Plymouth Borough Asylum*. Res. Med. Supt., W. H. Bowes, M.D. Access—Wragaton G.W.R., $1\frac{1}{2}$ miles; Ivybridge, 3 mls.

Jersey.—*Cranbourne Hall*, Grouville. Med. Supt., A. C. Stamborg, M.D.

The Grove. Res. Med. Prop., F. N. Gaudin, M.R.C.S. $2\frac{1}{2}$ miles from St. Heliers, 2 from St. Aubin's.

Jersey Asylum, St. Heliers. Res. Med. Supt., Julius Labey, M.R.C.S. Access—Gorey Village, 1 mile.

Kilkenny.—*District Asylum*. Res. Med. Supt., G. F. West, L.R.C.P. Access—Kilkenny station, $\frac{1}{4}$ mile.

Killarney.—*District Asylum*. Res. Med. Supt., E. W. Griffin, M.D. Asst. Med. Off., G. W. Downing, L.R.C.P. & S. Access—Killarney, $\frac{1}{2}$ mile.

- Kirkby Lonsdale.—*Greta Bank*. Res. Licensee, Mrs. Taylor. Access—Bentham (M.R.) 2 miles.
- Kirkintilloch (near Glasgow).—*Westermains Private Asylum*. For ladies; quiet cases only received. Apply to Mr. Lawrie, Res. Proprietor. *See also p. 812*
- Knowle (near Fareham).—*County Asylum*. Med. Supt., H. K. Abbott, M.D.
- Lancaster.—*County Asylum*. Res. Med. Supt., D. M. Cassidy, M.D. Access—Lancaster, L. & N.W. and Midland stations, each $1\frac{1}{4}$ miles.
- Leeds (Menston, near).—*West Riding Asylum*. Res. Med. Supt., Dr. J. G. McDowall. Access—Menston, 1 mile.
- Leek (Stafford).—*County Asylum*, Cheddleton. Med. Supt., W. F. Menzies, M.D. Access—Wall Grange station, 1 mile.
- Leicester.—*Borough Asylum*. Res. Med. Supt., J. E. M. Finch, M.D. Access—Leicester.
Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Access—Leicester Town, 1 mile.
- Letterkenny.—*Donegal District Asylum*. Res. Med. Supt., E. E. Moore, M.D. Asst. Med. Off., J. C. Martin, L.R.C.S.I. Access—Letterkenny and Lough Swilley Rly., 1 mile.
- Lichfield.—*County Lunatic Asylum*, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Access—Lichfield City, $3\frac{1}{2}$ miles; Trent Valley, $4\frac{1}{2}$ miles; Hammerwich, $1\frac{1}{2}$ miles.
- Limerick.—*District Asylum*. Res. Med. Supt., Dr. E. D. O'Neill. Access—Limerick station, $\frac{1}{2}$ mile.
- Lincoln.—*District Asylum*, Bracebridge. Res. Med. Supt., Dr. T. L. Johnston. Access— $2\frac{1}{2}$ miles from Lincoln G.N.R. station.
The Lawn. Res. Med. Supt., Arthur P. Russell, M.B. Access—Lincoln station, 1 mile.
See also p. 814
- Liverpool.—*Shaftesbury House*. Near Liverpool and Southport. Res. Med. Supt., Stanley A. Gill, B.A., M.D. Access—Formby station, $\frac{1}{4}$ mile distant. *See also p. 804*
- Tue Brook Villa*, Liverpool, E. Res. Med. Supt., Dr. J. A. Cooke. (For 52 males and females). Access—Tue Brook station or Green Lane car. *See also p. 815*
- London.—*Bethlem Royal Hospital*, St. George's Road, London, S.E. Res. Med. Supt., Theo. B. Hyslop, M.D., M.R.C.P.E. *See also p. 810*
Bethnall House, Cambridge Road, N.E. Res. Med. Supt., J. K. Will, M.D. Access—Cambridge Heath station.
Brooke House, Upper Clapton. Props., Mr. H. T. Monro and Dr. J. O. Adams. Res. Med. Supt., Dr. J. O. Adams. Access—Clapton.
Camberwell House, Peckham Road, S.E. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Offs., E. H. Griffin, B.A., L.S.A., and G. A. Fleming, L.R.C.S. & P. *See also p. 811*
Chiswick House, Chiswick. Res. Lics., Dr. T. S. Tuke; Med. Supt., C. M. Tuke. Access—Chiswick station, $\frac{1}{2}$ mile; Turnham Green station, 1 mile.
Clarence Lodge, Clapham Park, S.W. Lic., Miss F. Leech, B.A. Med. Off., Dr. G. F. Blandford. Access: Clapham Rd., and Clapham Common (Electric), 15 minutes.
Featherstone Hall, Southall. Res. Med. Lic., Dr. W. H. Bailey. Access—Southall station, 5 minutes.
Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., Dr. J. R. Hill. Access—Tulse Hill, 5 minutes, and Herne Hill, 15 minutes. *See also p. 814*
Flower House, Catford, S.E. Res. Med. Supt., C. A. Mercier, M.B. Access—C. & D. R. Beckenham Hill, 5 minutes.
Grove Hall, Bow (both sexes). Med. Lic., Dr. Mickle. Access: Bow Road and Bow stations, $\frac{1}{2}$ mile.
Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Access—Sunbury station, $1\frac{1}{4}$ mile.
Hayes Park, Hayes, Middlesex, near Uxbridge. Res. Med. Off., Dr. J. W. Higginson. Access—Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon. Med. Lic., F. W. Edridge Green, M.D., F.R.C.S. Access—By M.R., Hendon station, $\frac{1}{2}$ mile, or 'bus from Swiss cottage, St. John's Wood, N.W.

London County Asylum, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., D. J. Jones, M.D. Access—Belmont station, $\frac{1}{2}$ mile; Sutton station, $1\frac{1}{2}$ miles.

London County Asylum, Bexley, Kent. Res. Med. Supt., T. E. K. Stansfield, M.B. Access—Bexley station, $1\frac{1}{2}$ miles.

London County Asylum, Cane Hill, Coulsdon, Surrey. Res. Med. Supt., Dr. J. M. Moody. Access—Coulsdon, S.E.R., or Stoat's Nest, L.B. & S.C.R., 10 minutes.

London County Asylum, Claybury, Woodford, Essex. Res. Med. Supt., Robert Jones, M.D. Access—Woodford, $1\frac{1}{2}$ miles.

London County Asylum, Colney Hatch, N. Res. Med. Supt., W. J. Seward, M.B. Access—New Southgate, G.N.R.

London County Asylum, Hanwell. Res. Med. Supt., Dr. P. J. Baily.

London County Asylum, Horton, near Epsom. Res. Med. Supt., Dr. F. Bryan. Access—L. & S.W.Rly. $1\frac{1}{4}$ miles.

Middlesex County Asylum, Tooting, S.W. Med. Supt., H. G. Hill, M.R.C.S. Access—Wandsworth Common station, 1 mile.

Moorcroft House, Hillingdon (males). Uxbridge, 2 miles; London, 13 miles. Med. Licensees Dr. H. Stilwell, and Dr. R. H. Cole. Access—West Drayton, 2 miles.

Newlands House, Tooting Bec Road, S.W. (for gentlemen). Lic. Prop., A. H. Sutherland. Med. Supt., H. J. Hind, M.R.C.S. Access—Balham station, 1 mile, and tram. See also p. 808

Northumberland House, Green Lanes, N. Prop., A. H. Stocker, M.D. Res. Med. Supt., Dr. Frank R. King. Access—Finsbury Park station, 1 mile. See also p. 813

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., A. H. Sutherland. Lady Supt., Mrs. Chapman. Access—West Kensington station, 1 mile.

See also p. 808

Peckham House, Peckham, S.E. Prop., Alonzo H. Stocker, M.D. Res. Med. Supt., Harold C. Halsted, M.D. Access—Peckham Rye sta., 10 minutes' walk. See also p. 814

St. Luke's Hospital, Old St., E.C. Res. Med. Supt., Wm. Rawes, M.D., F.R.C.S. Convenient to all principal London stations.

See also p. 810

The Grange, East Finchley, N. Res. Licensees, Dr. F. and Mrs. Watson.

The Priory, Roehampton, S.W., near Richmond. Res. Med. Supt., James Chambers, M.D. Access—Barnes station, 10 minutes.

Vine Cottage, Norwood Green, Middlesex. Res. Med. Prop., H. C. Titterton, M.R.C.S. Access—Southall, 1 mile.

West Ham Boro' Asylum, Goodmayes, Ilford. Res. Med. Supt., Dr. D. Hunter. Access—Goodmayes, $\frac{3}{4}$ mile.

Wood End House, Hayes (ladies). Uxbridge, 3 miles; London, 12 miles. Med. Lic., Dr. H. Stilwell. Access—Hayes station, 1 mile.

Londonderry.—District Asylum. Res. Med. Supt., Dr. Hetherington. Access—Londonderry, 1 mile.

Macclesfield.—Parkside Asylum. Res. Med. Supt., T. Steele Sheldon, M.B. Lond. Access—Macclesfield, 1 mile.

Maidstone.—Kent County Asylum. Res. Med. Supt., H. W. Lewis, M.D. Access—Maidstone station, $1\frac{1}{2}$ miles.

Malling Place and Winthies Cottage (for ladies), and *Castle House* (for gentlemen). Res. Med. Supt., Dr. James Adam. Access—Malling station, 1 mile.

Market Lavington (Wilts).—Fiddington House. Prop., Major Reilly. Res. Med. Supt., Dr. J. Selfe Lush. Access—Lavington, $1\frac{1}{2}$; Devizes, 6 miles.

Maryborough (Queen's County).—Maryborough Asylum. Res. Med. Supt., Dr. P. Coffey. Access—Maryborough, $\frac{1}{2}$ mile.

Melrose, N.B.—Roxburgh District Asylum. Res. Med. Supt., J. C. Johnstone, M.D. Access—Melrose, 1 mile.

- Melton. — *Suffolk County Asylum*, near Woodbridge. Res. Med. Supt., J. R. Whitwell, M.B. Access—Melton station, $1\frac{1}{4}$ miles; Woodbridge station, $2\frac{1}{4}$ miles.
- Middlesboro'. — *County Boro' Asylum*. Res. Med. Supt., Dr. J. W. Geddes. Access—Middlesboro', 2 miles.
- Monaghan (Ireland). — *District Asylum*. Res. Med. Supt., Dr. Edwd. Taylor. Access—Monaghan, $\frac{1}{4}$ mile.
- Montrose, N.B. — *Montrose Royal Lunatic Asylum*. Phys. Supt., John G. Havelock, M.D. Access—Hillside, $\frac{1}{4}$ mile; Dubton, 1 mile.
- Morpeth. — *Northumberland County Asylum*. Res. Med. Supt., Thos. W. McDowell, M.D. Access—Morpeth station, 1 mile, by 'bus.
- Mullingar. — *District Asylum*. Res. Med. Supt., Dr. A. Finegan. Access—Mullingar station, 1 mile.
- Nelson (Lancs.). — *Marsden Hall*. Res. Licensee, Mrs. Moor. Access—Nelson station, L. & Y. Rly.
- Newcastle-on-Tyne. — *City Asylum*, Gosforth. Res. Med. Supt., James T. Callcott, M.D. Access—Newcastle, 4 miles.
- Newton-le-Willows, near (Lanc.) — *Haydock Lodge Asylum*. Res. Med. Prop., Dr. C. T. Street. Access—Newton-le-Willows station, 2 miles.
- Northampton. — *Berrywood Asylum*. Res. Med. Supt., W. Harding, M.D. Access—Castle station, $2\frac{1}{2}$ miles; Midland station, 3 miles.
St. Andrew's Hospital. Med. Supt., J. Bailey, M.R.C.S. Access—Northampton station, 1 mile.
See also p. 805
- Norwich. — *Heigham Hall*. Res. Phys. and Prop., J. G. Gordon-Munn, M.D. Access—Victoria station, 1 mile; Thorpe station, $1\frac{1}{2}$ miles.
Norfolk County Asylum, Thorpe (1000 beds). Res. Med. Supt., D. G. Thomson, M.D. Access—Whitlingham station, 1 mile; Norwich, $2\frac{1}{2}$ miles.
Norwich City Asylum, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. A. Sykes. Access—Hellesdon, 1 mile.
The Bethel Hospital for the Insane. Res. Med. Supt., J. Fielding, M.D. Cons. Phys., Saml. J. Barton, M.D. Access—Norwich (Thorpe) station, 1 mile.
See also p. 806
- Nottingham. — *City Asylum*, Mapperley Hill. Med. Supt., E. Powell, M.R.C.S.
Notts County Asylum. Med. Supt., A. M. Jackson, M.D. Access—Radcliffe-on-Trent, 2 miles.
The Coppice. Res. Med. Supt., W. B. Tate, M.D. Access—Midland station, $2\frac{1}{2}$ miles; Gt. Northern & Gt. Central station, $1\frac{1}{2}$ miles.
- Omagh. — *District Asylum*. Res. Med. Supt., Geo. E. Carre, M.B. Access—Omagh station, $1\frac{1}{2}$ miles.
- Oxford. — *Oxford County Asylum*. Res. Med. Supt., T. S. Good, M.R.C.S. Access—Littlemore station.
The Warneford, Oxford, $1\frac{1}{2}$ miles. Res. Med. Supt., James Neil, M.D. Access—Oxford station, $2\frac{1}{4}$ miles.
- Paisley. — *Parochial Asylum*, Crow Road. Vis. Med. Off., T. Graham, M.D.; Res. Med. Off., Jessie P. Duncan. Access—Paisley, 1 mile.
Parochial Asylum, Riccartonbar. Med. Off., D. Fraser, M.D. Access—Paisley West, $\frac{1}{4}$ mile.
- Perth. — *District Asylum*, Murthly. Res. Med. Supt., Lewis C. Bruce, M.D. Access—Murthly.
James Murray's Royal Asylum, Perth (for private patients only). Phys. Supt., A. R. Urquhart, M.D., F.R.C.P. Ed. Access—Perth station, under 2 miles. *See also p. 813*
- Plympton. — *Plympton House*, Plympton, South Devon. Res. Med. Supt., Dr. Alfred Turner. Access—Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles.
See also p. 811
- Portsmouth. — *Borough Asylum*. Res. Med. Supt., B. H. Mumby, M.D., D.P.H. Access—Fratton, $1\frac{1}{2}$ miles.
- Prestwich (nr. Manchester). — *County Asylum*. Res. Med. Supt., Dr. F. Perceval. Acc.—Prestwich, 1 mile.
- Rainhill (near Liverpool). — *County Asylum*. Res. Med. Supt., J. Wiglesworth, M.D. Access—St. Helens, $2\frac{1}{2}$ miles; Rainhill, 1 mile.
- Rotherham (Yorkshire). — *Thundercliffe Grange*, 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Access—Grange Lane station, $\frac{1}{4}$ mile.
See also p. 815
- Salisbury. — *Fisherton House Asylum*. Med. Supt., Dr. J. L. Baskin. Access—Salisbury station, 5 mins.
See also p. 806

- Laverstock House.* Med. Supt., Hy. J. Manning, M.R.C.S. Access—Salisbury, $1\frac{1}{2}$ miles.
- Shrewsbury.—*Salop & Montgomery Counties Asylum.* Res. Med. Supt., D. F. Rambaut, M.D. Access—Shrewsbury station, $2\frac{1}{2}$ miles.
- Sleaford.—*Kesteven County Asylum.* Med. Supt., J. A. Ewan, M.D.
- Sligo.—*District Asylum.*—Res. Med. Supt., Dr. Joseph Petit. Access—Sligo station, $1\frac{1}{2}$ miles.
- Stafford.—*County Asylum.* Res. Med. Supt., Dr. J. W. S. Christie. Access—Stafford, 1 mile.
- Institution for the Insane,* Coton Hill. Res. Med. Supt., Dr. R. W. Hewson. Access—Stafford, 1 mile.
- See also p. 803
- Starcross (near Exeter).—*Western Counties Idiot Asylum.* Res. Supt., E. W. Locke. Access—Starcross station, 5 minutes.
- Stirling.—*District Asylum.* Med. Supt., Dr. George M. Robertson. Access—Larbert, $1\frac{1}{2}$ miles.
- St. Albans (Hill End).—*Herts County Asylum.* Med. Supt., A. N. Boycott, M.D. Access—Hill End station, G.N.R., 2 minutes.
- St. Leonards-on-Sea.—*Ashbrook Hall,* Hollington (for ladies). Res. Props., Mrs. Hitch and Miss Adams. Med. Supt., Dr. E. Kaye Smith. Access—Warrior Square station, 2 miles.
- Stone (near Aylesbury).—*Bucks County Asylum.* Res. Med. Supt., J. Humphry, M.R.C.S. Access—Aylesbury station, $3\frac{1}{4}$ miles.
- Sutton (Surrey).—*Chalk Pit House* (licensed for 3 lady patients). Prop., F. D. Atkins, M.R.C.S.
- Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Prop., E. Hollins, M.A. Access—Tamworth $\frac{3}{4}$ mile.
- See also p. 800
- Taunton.—*Somerset & Bath Asylum,* Cotford, near Taunton. Res. Med. Supt., Mr. H. T. S. Aveline. Access—Norton Fitzwarren station, 2 miles.
- Ticehurst (Sussex).—*Asylum.* Props., Drs. H. & A. Newington. Access—Ticehurst Road 3 miles, Wadhurst S.E. & C.R., 4 miles.
- Tonbridge.—*Redlands.* Res. Med. Supt., W. A. Harmer. Access—Tonbridge junc., S.E. & C.R., $2\frac{1}{2}$ miles.
- See also p. 799
- Virginia Water.—*Holloway Sanatorium,* Hospital for the Insane. St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., G. W. Smith, M.B., C. E. C. Williams, M.B., Sheila M. Ross, M.B. Access—Virginia Water station, 5 mins. Seaside Branch, Hove Villa, Dyke Road, Brighton. Med. Off., E. N. Edwards, M.R.C.S.
- See also p. 812
- Wadsley (near Sheffield).—*South Yorkshire Asylum.* Res. Med. Supt., W. S. Kay, M.D. Access—Wadsley Bridge, 1 mile.
- Wakefield.—*West Riding Asylum.* Res. Med. Supt., W. Bevan-Lewis, M.S., L.R.C.P. Access—Kirkgate and Westgate station, 1 mile.
- Wallingford (Berks).—*Berkshire Asylum.*—Res. Med. Supt., J. W. A. Murdoch, M.B. Access—Cholsey, 1 mile.
- Warwick.—*Midland Counties Asylum,* Knowle, near Birmingham (for feeble-minded children). Sec. and House Gov., A. H. Williams. Med. Off., R. H. Foster, M.R.C.S. Access—Knowle, $\frac{1}{2}$ mile.
- See also p. 808
- Waterford.—*District Asylum.* Res. Med. Supt., J. A. Oakshott, M.D. Access—Waterford and Kilkenny station, 2 miles.
- St. Patrick's Inst.,* Belmont Park. Conducted by the Brothers of Charity. Med. Supt., W. R. Morris, M.B.
- Wells.—*Somerset and Bath Asylum,* Wells, Som. Res. Med. Supt., Dr. G. Stevens Pope. Access—Wells, 2 miles; Masbury, $2\frac{1}{2}$ miles.
- Whitchurch (Salop).—*St. Mary's House* (ladies only). Res. Med. Supts., S. T. Gwynn, M.D., & C. H. Gwynn, M.D. Access—Whitchurch, 1 mile.
- Whitefield (near Manchester).—*Overdale.* Vis. Phys., G. E. Mould, M.R.C.S. Access—Prestwich and Whitefield station, $1\frac{1}{2}$ miles; Molyneux Brow, $\frac{1}{4}$ mile.
- Whittingham (nr. Preston).—*County Asylum.* Res. Med. Supt., Dr. J. F. Gemmel. Access—Grimsargh station, $1\frac{3}{4}$ miles; Whittingham station, 3 minutes.

- Winchelsea (Sussex).—*Periteau*, near Hastings (5 ladies). Prop., Mrs. R. V. Skinner. Med. Supt., E. W. Skinner, M.D. Access—Winchelsea station, 1 mile.
- Witham (Essex).—*The Witham Asylum* (Licensed for both sexes). Res. Med. Licensee, Dr. F. C. Payne. Access—Witham station, $\frac{1}{4}$ mile. See also p. 804
- Woking. — *Surrey County Asylum*, Brookwood. Res. Med. Supt., Dr. J. E. Barton. Access—Brookwood station, $1\frac{1}{4}$ miles.
- Worcester.—*County & City Lunatic Asylum*, Powick. Res. Med. Supt., Dr. G. M. P. Braine-Hartnell. Access—Worcester station, 4 miles.
- York.—*The Pleasaunce* (ladies only). Prop. & Med. Supt., G. I. Swanson, M.D. Access—York, $1\frac{1}{2}$ miles. See also p. 802
- The Retreat*. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). Access—York station, $1\frac{1}{2}$ miles. Also Throxenby Hall, a branch house, near Scarborough. See also p. 800
- North Riding of Yorkshire Asylum*, Clifton. Res. Med. Supt., A. J. Eades. Access—York station, 2 miles.
- Bootham Park Registered Hospital*, Bootham. Res. Med. Supt., C. K. Hitchcock, M.D., M.A. Cantab. Access—York station, 1 mile.

TRAINING INSTITUTIONS.

- Bath.—*Rock Hall House*, Combe Down, near Bath (for backward and imbecile children). Lady Supt., Miss Jane Quinton. Med. Off., J. L. Beath, M.D. Clerk, E. N. Fuller, LL.B., Bath. Access—G.W.R., $1\frac{1}{2}$ miles.
- Dublin.—*Stewart Institution*, Palmerston, Chapelizod, Co. Dublin (for imbecile children). Med. Supt., Dr. F. E. Rainsford.
- Dundee.—*Baldovan Asylum* (for the training and education of imbecile children). Matron, Miss Henry, Med. Supt., D. M. Greig, F.R.C.S. Access—Baldovan, 1 mile.
- Kingston Hill.—*Windsor Asylum* (for backward and feeble-minded children). Res. Med. Supt., Dr. Fletcher Beach. Access—Norbiton station, S.W.R., 15 minutes. See also p. 779
- Kingston-on-Thames (Surrey).—*Normansfield, Trematon & Conifers* (for backward and feeble-minded of either sex). Res. Med. Supt., Dr. Langdon Down. Access—Hampton Wick station, 8 minutes.
- Lancaster.—*The Royal Albert Asylum* (for the feeble-minded of the Northern Counties; 700 patients). Res. Med. Supt., Dr. A. R. Douglas. Sec., Saml. Keir. Access—Lancaster, 1 mile; and *Brunton House*, a Private Home in connection with the Royal Albert Asylum.
- Larbert (Stirlingshire). — *Scottish National Institution* (for education of imbecile children). Res. Supt., A. A. Skene. Med. Officer, Dr. R. D. Clarkson. Sec. & Treas., A. J. Fitch, Virginia Buildings, Glasgow. Access—Larbert station, $\frac{3}{4}$ mile.
- London (Upper Norwood, S.E.).—*Grosvenor* (for boys), 84, Auckland Road. Miss Arkell.
- Southgate (Middlesex).—*Brook House* (for children). Res. Med. Prop., Harry Corner, M.D.

SANATORIA FOR CONSUMPTION, AND OTHER FORMS OF TUBERCULOSIS.

NOTE. References to Sanatoria in the United States and Canada may be found in *A Directory of Institutions and Societies dealing with Tuberculosis*, New York; and *Consumption and Civilization*, by John B. Huber, M.D., Philadelphia and London: J. B. Lippincott Co. Particulars of Foreign Sanatoria will be found in *Sanatoria for Consumptives*, by F. Rufenacht Walters, M.D. 3rd Edition. London: Swan, Sonnenschein & Co.

- Axbridge (Somerset).—*St. Michael's Home* (41 beds, 24 male and 17 female). Apply to Sister in Charge. Med. Off., R. W. Statham, M.R.C.S. Access: Axbridge, $\frac{1}{2}$ m. Terms free.
- Banchory (Scotland).—*Nordrach-on-Dee* (54 beds). Res. Phys., D. Lawson, M.A., M.D., J. Miller, M.D., F. L. Atkinson, M.B. Access—Banchory station, 2 miles

- Belbroughton (Worcs.).**—*Midland Open - air Sanatorium*, Bourne Castle (24 beds). Apply, Secretary. Res. Med. Off., Geo. F. Phillpot, M.R.C.S. Access—Hagley, G.W.R.; Bromsgrove, M.R.
- Benenden (Kent).**—*Sanatorium of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis."* Med. Supt., Leonard Crossley, M.D.
- Bingley (Yorks.).**—*Eldwick Sanatorium*, for females only (24 beds). Vis. Phys., Dr. Margaret Sharpe. Access—Bingley station, 2 miles.
- Bournemouth.**—*Alderney Manor*, Parkstone (26 beds). Res. Phys., Dr. W. Denton Johns. Access—Parkstone station, 2 miles.
Overton Hall, 6, *Poole Road* (12 beds). Res. Prop., Dr. C. Guthrie Stein. Access—Bournemouth West, 7 minutes.
Royal National Sanatorium for Consumption and Diseases of Chest (85 beds). Sec., A. G. A. Major. Res. Phys., A. W. Tuxford, M.B., D.P.H. Access—Bournemouth station, 1 mile. Terms 7/6 per week and a Governor's nomination.
The Firs Home (for advanced cases), (20 beds). Hon. Sec., Percy J. Duncan, M.D., Frogmore, Bournemouth. Hon. Med. Offs., P. J. Duncan, M.D., and S. G. Champion, M.D. Lady Supt., Miss McGuire.
The Home Sanatorium, Southbourne Road. Res. Phys., J. R. Morton, M.B. Access—Bournemouth Central, 2½ miles; Boscombe, 1½ miles; Christchurch, 2½ miles. See also p. 780
- Bridge of Weir (Renfrewshire).**—*Consumption Sanatoria of Scotland*. (94 beds, women and children; 40 beds, males). Hon. Sec., J. P. Maclay, Esq., 21, Bothwell Street, Glasgow. Med. Supt., John Guy, M.D. Access—Bridge of Weir, 2 miles.
- Brighton.**—*Municipal Sanatorium*, for Brighton townfolk. Objects: educational, and for treatment of both early and advanced cases. Physician, Dr. Arthur Newsholme, M.O.H. for Brighton. Particulars, Town Hall, Brighton.
- Chagford (Devon).**—*Dartmoor Sanatorium* (near Exeter, Newton Abbot, and Okehampton). Res. Med. Supt. and Prop., Dr. A. Scott Smith. Access—Moretonhampstead, G.W.R., 6½ miles; Okehampton station, L. & S.W.R., 11 miles.
- Cheddar (Somerset).**—*Engel Home*, for females only (18 beds). Med. Supt., R. W. Statham, M.R.C.S. Apply to Lady Supt. Access—Cheddar station, 10 minutes.
- Cheltenham.**—*Cotswold Sanatorium*. Res. Phys., Dr. F. K. Etlinger. Address—Cotswold Sanatorium, near Stroud. See also p. 782
- Chiltern Hills Sanatoria.**—*Kingwood* (14 beds) and *Maitland Cottage* (for working classes, 18 beds), Peppard Common, Oxon. Res. Med. Prop., Dr. Esther Colebrook Carling. Access—Reading, 6½ miles.
- Clare (Suffolk).**—*Richmond House* (15 beds). Med. Supt., G. H. Metcalfe, M.R.C.S. Access—Clare station, 5 minutes.
- Crieff (Perthshire).**—*Ellerslie Sanatorium*. Res. Prop., Thompson Campbell, M.D. Access—Caledonian Railway, Crieff station, ½ mile. See also p. 780
- Devon and Cornwall Sanatorium**, Didworthy, South Brent. For consumptive poor of the two counties. Hon. Sec., S. Carlisle Davis, Esq., 28, Westwell street, Plymouth. Res. Med. Supt., Dr. J. C. Fleming. Access—Brent, G.W.R., 2 miles.
- Dorking (Surrey).**—*Woodhurst Sanatorium* (for Ladies and Girls only), Tower Hill (16 beds). Sec., Geo. Wright. Visiting Phys., Miss Mary R. McDougall, M.B., C.M. Ed. Access—L.B. & S.C.R. and the S.E. stations, both about 1 mile.
 Terms: from 1½ guineas weekly according to bedroom accommodation.
- Dundee (nr.).** *Sidlaw Sanatorium* (40 beds). Res. Phys., Dr. A. K. Traill. Access—Auchterhouse station, 1½ miles.
- Durham.**—*Durham County Consumption Sanatorium*, Stanhope (45 beds, 30 male and 15 female). Sec. Mr. F. Forrest, 54, John Street, Sunderland. Med. Supt., Dr. John Gray. Access—Stanhope station, 1 mile. Terms free and by payment.

- Edinburgh, Craigleith.—*Royal Victoria Hospital for Consumption* (60 beds). For the treatment of poor patients. Visiting Physicians, Dr. R. W. Philip and Dr. G. L. Gulland. Clerk and Treasurer, 4a, St. Andrew Square, Edinburgh.
- Woodburn, *Morningside* (20 beds). Res. Med. Prop., Mrs. W. P. Mears, L.R.C.P.I.
- Eversley (Hants).—*Moorcote* (15 beds). Res. Med. Supt., J. G. Garson, M.D. Access—Wellington College station, $4\frac{1}{2}$ miles; Wokingham sta., 6 miles; Fleet, 6 miles.
- Farnham (Surrey).—*Crooksbury Sanatorium* (24 beds). Res. Phys., Dr. F. Rufenacht Walters. Access—Farnham station, $3\frac{1}{2}$ miles; Tongham, $2\frac{1}{2}$ miles; Ash, 4 miles.
- See also p. 781
- Whitmead *Sanatorium*. Res. Phys., J. Hurd-Wood, M.D. Access—Farnham station, $3\frac{1}{2}$ miles.
- Fortbreda, Belfast.—*Forster Green Consumption and Chest Hospital* (38 beds). Vis. Phys., Drs. R. J. Purdon, J. Simpson, F. Howard Sinclair. Sec., A. Shaw, 2, May Street, Belfast. Access—Belfast, 2 miles. Mainly for the poor; 6 beds free; others by small payment.
- Frimley (Surrey).—*Brompton Hospital Sanatorium and Convalescent Home*. Res. Med. Supt., Dr. M. S. Paterson. Access—Frimley sta., 2 miles.
- Hastings.—*Fairlight Hall Convalescent Home*, Old London Road, Ore, in connection with Margaret Street Hospital for Consumption and Diseases of the Chest (for Out-Patients), 26, Margaret Street, London, W. (22 beds). Sec., Alice D. Brookes. Med. Off., Dr. N. F. Stallard. Access—Hastings, Motor bus, about 15 minutes. Payments, by subscriber's letter, 11/6.
- Hull.—*Hull and East Riding Convalescent Home*, Withernsea (30 beds). Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproule, L.R.C.P. Access—Withernsea station.
- Isle of Wight.—*Church Hill House*, Ventnor (Private Sanatorium). Matron, Miss Moyse-Hopkins.
- Royal National Hospital for Consumption*, Ventnor. Sec., Ernest Morgan, 34, Craven Street, Charing Cross, W.C. Terms 10/- per week and a recommendation from Governors.
- St. Catherine's Home*, Ventnor (for advanced cases). (12 beds, 6 male and 6 female.) Apply to Sister Bernardine. Med. Officer, H. F. Bassano, M.A., M.B. Access—Ventnor, 5 mins. drive. Terms, by selection, 10/6 per week.
- Jersey.—*Pinehurst Sanatorium*, St. Brelades. Res. Physician, Dr. J. S. Newington.
- Kingussie (Inverness-shire, Scotland).—*The Grampian Sanatorium* (18 beds). Physician, Walter de Watteville, M.D. Access—Main Highland Rly., Kingussie, $\frac{3}{4}$ mile.
- Kinross-shire (Scotland).—*Ochil Hills Sanatorium* (60 beds). Sec., D. Hill Jack, 141, West George Street, Glasgow. Med. Supt., J. J. Galbraith, M.D. Access—Kinross junction, 4 miles.
- Kirkmichael (Scotland).—*Knocksualtach* (6 beds). Med. Supt., Mary F. Nanetti L.R.C.P. Access—Blairgowrie station, 13 miles, by coach.
- Leeds.—*Leeds Sanatorium for Consumptives*, Gateforth, near Selby (34 beds), and *Leeds Hospital for Consumptives*, Armley (36 beds). Sec., C. H. Sedgwick, 37, Great George St., Leeds. Terms free, for poor of Leeds.
- Leslie (Fife).—*Walkerton Sanatorium*. Apply Secretary.
- Liverpool.—*Liverpool Sanatorium for Consumptives*, Kingswood, Frodsham (40 beds). Sec., Alfred Shawfield, 77a, Lord St., Liverpool. Res. Phys., Dr. Herapath Wood. Access—Frodsham, L. & N.W.R. $3\frac{1}{2}$ miles.
- London.—*City of London Hospital for Diseases of Chest*, Victoria Park, E. Open-air treatment provided. (164 beds). Sec., H. Dudley Ryder.
- Mount Vernon Hospital for Consumption and Diseases of the Chest*, Hampstead (150 beds). Access—Finchley Road (Met.) station, 1 mile. The *Country Branch Hospital at Northwood* accommodates 100 cases. Access—Northwood (Met. & G.C. Rly.) Hon. Vis. and Res. Staff. Free on recommendation of governors. Secretary, W. J. Morton.
- Royal Hospital for Diseases of the Chest*, 231, City Road, E.C. (80 beds). Med. Off., P. A. Dingle, M.D. Apply to the Secretary.

- Long Stratton (Norfolk).—*Fritton Sanatorium* (7 beds). Res. Phys., Miss Mary Smith, L.R.C.P. Matron, Miss Wainwright. Access—Fornsett station, G. E. 4 miles.
- Maldon (Essex).—*The Sanatorium*. Med. Off., H. L. Ewens, M.D. Access—Maldon East, $1\frac{1}{2}$ miles.
- Manchester.—*Hospital for Consumption and Diseases of Throat and Chest*. Hospital at Bowdon; Crossley Sanatorium, Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester. Res. Phys. (Bowdon), A. H. Norris, M.R.C.S. (Delamere), D. Lloyd Smith, M.B. Access—Bowdon: Altrincham station, $\frac{1}{2}$ mile. Delamere: Mouldsworth or Frodsham, $3\frac{1}{2}$ miles.
- Margate (Kent).—*Royal Sea-bathing Hospital* (150 beds). Sec., A. Nash, 13, Charing Cross, S.W. Access—Margate West, $\frac{1}{4}$ mile.
- Meathop (near Grange).—*Westmoreland Sanatorium*. Res. Med. Supt., T. H. J. Hughes, M.R.C.S. Hon. Sec., Dr. W. Rushton Parker, Kendal. Access—Grange-over-Sands station, $2\frac{1}{2}$ miles.
- Mendip Hills, Blagdon, near Bristol.—*Nordrach-upon-Mendip* (40 beds). Res. Phys., R. Thurnam, M.D. Assist. Phys., A. de Winton Snowden, M.D. Access—Langford sta., 5 miles; Yatton Junc. 11 miles; Wells or Cheddar, 8 miles. Terms, 4 to 6 gns. weekly. See also p. 782
- Nayland (Suffolk).—*East Anglian Sanatorium* (35 beds), and *Maltings Farm Sanatorium* for 16 poor men and 16 women patients. Med. Supt., Dr. Jane Walker, 122, Harley Street, W. Access—Bures station, G.E.R., $3\frac{1}{2}$ miles.
- Norfolk.—*Kelling Sanatorium*, Holt. Assistance given to poor patients unable to pay. Hon. Sec., Dr. H. W. McConnel. Res. Med. Off., Mr. W. J. Fanning. Access—Holt station, Norwich.
- Mundesley Sanatorium*, Mundesley (30 beds). Res. Physician, S. Vere Pearson, M.B. Access—Mundesley station, 1 mile.
- Nottingham.—*Sherwood Forest Sanatorium*, for persons of limited means, resident in Notts and district (30 beds). Sec., G. Sheldon, 36a, Bridlesmith Gate, Nottingham. Res. Med. Off., Miss Ida E. Fox, M.D. Access—Mansfield, 3 miles. Free, or for 10/- per week, on recommendation of subscribers.
- Ockley Sanatorium (Surrey). Res. Phys., Dr. Clara Hind. Access—Ockley, L.B. & S.C.R., 1 mile.
- Okehampton (Devon).—*Dr. Rashleigh's Sanatorium*, Throwleigh. Res. Phys., J. C. S. Rashleigh, M.D. Access—Okehampton, L. & S.W.R., 7 miles.
- Painswick (Glouc'stershire).—*Painswick Sanatorium*, Cotswold Hills. Res. Phys. and Prop., W. McCall, M.D. Access—Stroud, 4 miles; Gloucester, 6 miles.
- Peebles.—*Manor Valley Sanatorium*, for patients with limited means. Terms—2½ guineas. Apply Secy. See also p. 780
- Penmaenmawr (N. Wales).—*Nordrach in Wales, Pendyffryn Hall* (21 beds). Res. Med. Prop., Dr. G. Morton Wilson. Access—Penmaenmawr station, 2 miles; Conway, 3 miles.
- Ringwood (Hants).—*Linford Sanatorium* (28 beds). Props. and Res. Phys., R. M. Smyth, M.D., and H. G. Felkin, M.D. Access—Ringwood station, $2\frac{1}{2}$ miles.
- Rudgwick (Sussex).—*Rudgwick Sanatorium*. Res. Med. Off. Dr. Annie McCall. Access—Rudgwick station, 5 minutes; Horsham sta., 7 miles.
- Ruthin (N. Wales).—*Vale of Clwyd Sanatorium*, Llanbedr Hall. Res. Props., Drs. G. A. Crace-Calvert and C. E. Fish. Access—Ruthin station, 2 miles. See also p. 782
- Sandon, near Danbury (Essex).—*Merivale Sanatorium*. Res. Phys., H. N. Marrett, M.R.C.S. Access—Chelmsford station, 4 miles.
- Shotley Bridge (Co. Durham).—*"Belle Vue" Sanatorium* (15 beds). Res. Phys., Dr. E. W. Diver. Access—Shotley Bridge sta., 1 mile.
- Skipton (Yorks).—*Eastby Sanatorium*, for males (30 beds). Conducted by Bradford Board of Guardians.

St. Leonards.—*Eversfield Chest Hospital*, West Hill (55 beds, 8 private wards). Sec., Miss Benwell. Res. Phys., T. Gambier, M.D. Fees, 17/- weekly, or 13/- with subscriber's letter, available 4 weeks. Access—West St. Leonards S.E.R., West Marina L.B. and S.C.R., within 5 minutes' walk.

Torquay.—*Mildmay Consumptive Home* for advanced cases only (10 beds). Hon. Med. Offs., F. D. Crowdy, M.D., and H. P. Wiggin, M.R.C.S. Hon. Sec., Miss F. Gumbleton, Connemara, Torquay. Access—Torquay, 1 mile. Fees, 10/6 weekly, or 7/- with subscriber's letter.

Western Hospital (40 beds). Open Oct. to May. Sec. F. Manley. Terms, 7/6 by nomination, 12/6 without.

Wallingford (Berks).—*The Chiltern Sanatorium*, Ipsden (25 beds). Res. Phys., F. S. Arnold, M.B. Access—Goring sta., G.W.R., $4\frac{3}{4}$ miles; or Wallingford, 4 miles.

Warrenpoint (Co. Down).—*Rostrevor Sanatorium*. Res. Phys., F. Howard Sinclair, M.D., and B. H. Steede, M.D. High Frequency Electrical

Installation. Access—Warrenpoint.

Terms, $3\frac{1}{2}$ guineas. See also p. 780

Wells (Somerset).—*Mendip Hills Sanatorium* (25 beds). Chief Phys., D. J. Chowry Muthu, M.D. Access—Wells station, $2\frac{3}{4}$ miles.

Wicklow.—*Alladore Sanatorium*, Kilpedder, Co. Wicklow (25 beds). Res. Phys., Dr. J. C. Smyth. Access—Dublin to Greystones, from which it is 5 miles.

The Royal National Hospital for Consumption for Ireland, Newcastle, Wicklow (48 beds for men, 52 for women). Hon. Sec., J. R. Orpen, 13, South Frederick Street, Dublin. Res. Phys. T. H. Peyton, M.B. Access—D.W.W.R. to Newcastle, Co. Wicklow, 3 miles. Minimum fees, 7/- weekly, on subscriber's recommendation and medical examination.

Wokingham.—*London Open-air Sanatorium*, Pinewood (64 beds). Sec., H. W. Harris, 20, Hanover Square, W. Access—Wellington College, S.E.R., 2 miles; or Wokingham, S.W.R., $3\frac{1}{2}$ miles.

Yelverton (South Devon). *Udal Torre*. Res. Med. Supt., J. Penn Milton, M.R.C.S.

INSTITUTIONS FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879-1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an "Inebriate" within the meaning of the Acts.

* NOTE: Ashford, Chiswick, and Spelthorne St. Mary, are Roman Catholic Religious Institutions.
† Cinderford, Cradley Heath, Herne Hill, King's Lynn, and Torquay, are C.E.T.S. Institutions.

MALES ONLY.

Buntingford (Herts).—*Buntingford House Retreat* (Patients 25). Two Res. Med. Supts. Access—Buntingford, G.E.R., 8 minutes.

See also p. 820

Cinderford† (Glos.).—*Abbotswood House*, for Male Inebriates. Res. Supt., F. Eardley-Wilmot. Access—Cinderford station.

Cockermouth (Cumberland).—*The Ghyll Retreat*. Res. Med. Prop., J. W. A. Cooper, L.R.C.S. Access—Cockermouth, 11 miles.

Colinsburgh (Fife).—*Inveruth Lodge Retreat*. Res. Med. Supt., Dr. J. Q. Donald. Access—Kilconquhar station, $4\frac{1}{2}$ miles.

Dinas Mawddwy (Merionethshire).—*Pläs-yn-Dinas* (Patients 17). Res. Med. Supt. and Licensee, Dr. W. F. Walker, J.P. Access—Cemmes Road. See also p. 817

Rickmansworth (Herts).—*Dalrymple House* (Patients 20). Res. Med. Supt., F. S. D. Hogg, M.R.C.S., L.R.C.P. Access—Rickmansworth station, Metropolitan Railway, $\frac{1}{2}$ mile; L. & N.W.R., 1 mile.

See also p. 820

Thundersley (Essex).—*Salvation Army Retreat* (Patients 26). Licensees, Mrs. Frost, and James McLauchlan. Access—Rayleigh, G.E.R., 3 miles.

Twickenham. — *High Shot House*. Private patients (ladies and gentlemen) also received. Med. Supts., M. H. Gardiner, M.B., and E. Le F. Payne, M.R.C.S. Access—St. Margaret's station from Waterloo, 300 yards; Richmond, $1\frac{1}{2}$ miles.

See also p. 816

MALE AND FEMALE.

Bristol. — *Brentry*, Westbury-on-Trym, for cases arising under the Licensing Act, 1902 (Patients 50). Res. Supt. and Med. Off., Dr. Fleck. Hon. Sec., Rev. H. N. Burden. Access—Clifton Down station, $3\frac{1}{2}$ miles.

Maldon (Essex). — *Rivermere*, Osea Island. Res. Med. Supt., F. F. Moore, L.R.C.S.I.

FEMALES ONLY.

Ashford, near Staines.* — *Ecclesfield*, Apply to the Mother Superior.

See also p. 821

Beverley (E. Yorks). — *Albion House* (Patients 22). Res. Supt., the Matron. Hon. Sec., Mrs. A. S. Pentith, The Limes, Sutton-on-Hull.

See also p. 821

Chiswick.* — *St. Veronica's Retreat* (Patients 40). Under the care of the Sisters of Nazareth. Med. Supt., John J. Atteridge, M.D. Access—Chiswick station, $\frac{1}{2}$ mile.

Cradley Heath† (Staffs). — *Corngreaves Hall* (Patients 32). Lic., Miss E. Eaves. Hon. Secretary, J. H. Broscomb, Lyncourt, Kingsbury Road, Erdington, Warwickshire. Access—Cradley and Old Hill stations, 1 mile.

Fallowfield. — *The Grove Retreat*, near Manchester (Patients 25). Licensee, Mrs. M. Hughes. Med.

Offs., A. T. Wilkinson, M.D., and J. W. Hamill, M.D. Hon. Treas., S. Gamble. Access Fallowfield station, 10 minutes.

Herne Hill.† — *Ellison Lodge*, Half Moon Lane (Patients 33). Res. Supt., Miss Corner. Med. Supt., Dr. P. Barham. Access—Herne Hill.

King's Lynn† (Terrington, St. Clement's). — *Hamond Lodge* (Patients 30). Res. Supt., the Sister in Charge. Med. Supt., S. R. Lister, M.R.C.S. Acc.—Terrington, $1\frac{1}{2}$ mls.

Leicester. — *Melbourne House* (Patients 10). Prop., Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D., Camb. Consultant, C. J. Bond, F.R.C.S. Station, 2 miles.

See also p. 821

Newmains (N.B.). — *Newmains Retreat*. Res. Med. Supt., G. R. Wilson, M.D. Access—Hartwood station. Cal. Rly.

See also p. 818

Reigate (Surrey.) — *Duxhurst* (Patients 10). Supt., Sister in charge. Med. Supt., A. Walters., M.R.C.S. Access—Reigate, 4 miles.

Spelthorne St. Mary* (Bedfont, Middlesex). — Apply to Sister Superior, C.S.M.V. Access—Felt-ham, S.W.R., 1 mile.

Licensed under Inebriates Acts. Females—Primarily Gentlewomen and Middle Classes (24). Treatment—Physical, Moral, and Spiritual.

Torquay.† — *Temple Lodge* (Patients 22). Res. Supt., Sister in charge. Med. Off., W. Odell, M.D., F.R.C.S. Hon. Sec., Mrs. H. H. Erskine.

Wandsworth. — *Northlands Retreat*, Fairfield Street, Old Wandsworth, S.W. (Patients 12). Med. Lic., Dr. J. Round. Lics., The Misses Round.

REFORMATORIES CERTIFIED UNDER THE INEBRIATES ACT, 1898.

MALE AND FEMALE.

Bristol. — *Brentry certified Inebriate Reformatory*, Westbury-on-Trym (Beds 240). Res. Supt. and Med. Officer, Dr. D. Fleck. Hon. Sec., Rev. H. N. Burden. Access—Clifton Down, Redland, or Patchway station, $3\frac{1}{2}$ miles.

FEMALES ONLY.

Ackworth (Yorkshire). — *North Midlands Inebriate Reformatory* (Beds 90). Res. Supt., the Officer in Charge. Med. Off., Dr. R. H. Rigby. Access—Ackworth station, $1\frac{1}{2}$ miles.

Bristol.—*Royal Victoria Home, Horfield* (Beds 25). Med. Off., Dr. W. Cotton. Hon. Sec., Rev. H. N. Burden. Access—Montpelier and Bristol stations.

Chesterfield (Derbyshire).—*Midland Counties Inebriate Reformatory, Whittington* (Beds 157). Med. Off., Dr. A. M. Palmer. Access—Whittington station, $\frac{1}{2}$ mile; Chesterfield, 5 miles.

East Harling (Norfolk).—*Eastern Counties Inebriate Reformatory, East Harling*, near Thetford (Beds 300). Res. Supt., Officer in Charge. Med. Off., Dr. W. Adams. Access—Harling Road station, $\frac{3}{4}$ miles.

Horley (Surrey).—*Farmfield* (Beds 113). For London cases, under Sec. II of the Act. Res. Supt., Miss Forsyth. Med. Off., Dr. C. F. Williamson. Access—Horley station, $2\frac{1}{2}$ miles.

Langho (Lancashire).—*Lancashire Inebriate Reformatory, Langho*, near Blackburn (Beds 185). For Lancashire cases. Res. Supt. and Med. Off., Dr. F. A. Gill. Access—Langho station, 2 miles.

Lewes (Sussex).—*Southern Counties Inebriate Reformatory, St. Anns, Lewes* (Beds 150). Res. Supt., the Officer in Charge. Med. Off., Dr. W. A. Dow. Access—Lewes station, 1 mile.

UNLICENSED HOMES.

Croydon.—*Woodside Court*, Lower Addiscombe Road, for ladies. (Patients 9). J. M. Hobson, M.D. Access—East Croydon, 12 minutes by tram.

Durham.—24, Allergate, for ladies. Hon. Sec., Miss King. Med. Supt., Dr. Robson. Access—Durham, $\frac{1}{2}$ mile.

Edinburgh.—*Queensberry Lodge*, for ladies. Supt., A. Miller. Med. Supt., Dr. William Russell. Access—Waverley station, $\frac{1}{2}$ mile.

See also p. 820

Greenock (N.B.).—*Seafeld House*. Res. Phys., J. H. Morrison, M.D.

Hounslow (Middlesex).—*West Holme*, for ladies. Supt., Matron in Charge. Med. Supt., Dr. G. A. S. Gordon. Access—Hounslow $\frac{3}{4}$; Dist. Rly., $\frac{1}{2}$ mile.

Huddersfield (Yorks).—*High Flatts Sanatorium*, for ladies. Matron, Miss M. E. Johnson. Access—Denby Dale, $1\frac{1}{2}$ miles.

Leicester.—*Tower House*, for ladies. Prop., Mrs. Theobald. Med. Attendant, A. V. Clarke, M.D. Access—Leicester station, $1\frac{1}{2}$ miles.

See also p. 819

Liverpool.—*Temperance Home*, 318, Upper Parliament Street, for ladies. Supt., Miss A. J. Wilson. Med. Supt., C. E. Solomon, M.D.

Lochgelly, Fifehire.—*Navitie Home*, for ladies. Hon. Sec., Mrs. Lockhart, 9, Royal Terrace, Edinburgh. Access—Lochgelly, 2 miles.

London.—*Dadson Nursing Home*, Kensington, W. Ladies and gentlemen can be attended by their own medical men. See also p. 816

Norwood Sanatorium, 93, Church Road, Upper Norwood, S.E. Med. Supt., F. Hare, M.D. Access—Crystal Palace station, 10 minutes.

See also p. 819

Weir Hall, Edmonton. Access—Silver Street (G.E.), 1 mile. Palmers Green (G.N.), $1\frac{1}{2}$ miles.

See also p. 821

Norwich.—*Dalson Nursing Home*, for working class men. Med. Supt., Dr. J. M. G. Bremner.

See also p. 816

Reynoldston, R.S.O. (Glam.).—*Gower Lodge Retreat*, for gentlemen. Res. Med. Supt., A. E. Mole, M.B., M.O.H. Access—Swansea, M.R., or G.W.R.

See also p. 818

Richmond.—*Dadson Nursing Home*, Richmond, for working class women.

See also p. 816

Southport.—*The Ranche*, Birkdale Park. Med. Supt., S. B. Fenn, L.R.C.S.

West Derby (near Liverpool).—*Vermont Sanatorium*, for ladies. Supt., Miss Mary M. Hocking. Med. Offs., Dr. H. Harvey, and Dr. C. Thurstan Holland. Access—West Derby station, $\frac{1}{4}$ mile; Tue Brook station, $\frac{1}{4}$ mile; Edge Hill station, 3 miles.

See also p. 819

HYDROPATHIC ESTABLISHMENTS.

We wish to make this list complete, but it is impossible when some Proprietors do not return our letter of enquiry, which is *stamped for reply*. This will account for some omissions in the present edition.

- Aberdeen.**—*Deeside Hydropathic*, Murtle, near Aberdeen. Res. Med. Supt., Alex. Stewart, M.D., LL.D., F.S.Sc. Access—Rail to Aberdeen, thence to Murtle station on the Deeside line, 5 miles from Aberdeen; from this station, 8 minutes.
See also p. 788
- Baslow.**—*Grand Hotel and Hydro*. Access—Bakewell station, 4 miles by 'bus.
- Bath.**—*Lansdown Hospital and Nursing Home*, Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Med. Supt., Dr. Percy Wilde. Access—M.R. or G.W.R. station, Bath, about 1 mile. *See also p. 778*
- Ben Rhydding.**—*Ben Rhydding Hydro*. Phys., Thos. Scott, M.D., and Dr. W. R. Bates. Access—Station, a few hundred yards.
- Bexhill-on-Sea.**—*Wilton Court Hotel and Hydro*. Manageress, Mrs. W. Purrott.
- Bishops-Teignton (nr. Teignmouth).**—*The South Devon Health Resort*. Prop., C. F. Carpenter. Med. Supt., Arthur E. Hayward, M.R.C.S. Access—Teignmouth, 2½ miles.
- Blackpool.**—*Matlock Hydro & Boarding House*, Station Road. Access—3 minutes' walk from South Shore station.
- Bournemouth (Hampshire).**—*Bournemouth Hydropathic*. Res. Phys., W. J. Smyth, M.D. Access—East station, 1½ mile; West station, ¼ mile. *See also p. 791*
- Bridge of Allan.**—*Bridge of Allan Hydropathic Co.* Manageress, Miss McNeill. Vis. Phys., Dr. Haldane. Access—Station, ¼ mile.
- Bristol.**—*The Bristol Hydropathic* (formerly Bartholomew's Turkish Baths), College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S.
- Burgess Hill (Sussex).**—*Wynnstay Hydro*. Manager, Geo. Barella.
- Bute.**—*Kyles of Bute Hydropathic*, Port Bannantyne, Rothesay. Man., A. Menzies. Med. Supt., Dr. A. J. Hall. Access—Clyde steamers call daily.
- Buxton.**—*Buxton Hydropathic*, Man. Director, H. Lomas. Access—Station, 4 minutes.
Corber Hill Hydro, Clarendon House. Man., Miss L. Adams. Access—Buxton station, 5 minutes.
Haddon Hall Hydro. Prop., Mrs. G. E. Hall.
Splendid situation. Lift. Billiards. Electric, Nauheim, and other Baths. Terms moderate.
The Peak Hydro. Man., Mrs. Macgregor.
- Callander, N.B.**—*Callander Hydro*. Apply, Manager.
- Caterham (Surrey).**—*Surrey Hills Hydropathic*. Res. Med. Supt., A. B. Olsen, M.D.
- Clevedon (Somerset).**—*Clevedon Hydropathic*. Res. Physician. Access—Clevedon, 1 mile.
- Clifton (near Bristol).**—*Clifton Grand Spa and Hydropathic*. Access—Clifton Down station, 1 mile; Bristol station, 1½ miles.
- Cork.**—*St. Ann's Hill Hydropathic*. Res. Phys., A. A. Hudson, M.D. Access—Blarney station, 2½ miles; Muskerry Light Railway from Cork, station on grounds.
- Crieff.**—*Strathearn House* (17 miles from Perth). Res. Med. Supts., Thos. H. Meikle, M.D., J.P., and T. Gordon Meikle, M.B., C.M. Access—Crieff station, 1 mile.
- Dunblane.**—*Philp's Dunblane Hydropathic*, Perthshire. Res. Phys., Dr. S. M. Sloan. Access—Dunblane station, ¾ mile. *See also p. 786*
- Eastbourne.**—*Eastbourne Hydropathic*. Man., O. F. Bergann.
- Edinburgh.**—*Hydropathic*, Slateford. J. Bell, Man. Dir. Access—Merchiston, 1 mile; Waverley, 3 miles.
- Forres.**—*Cluny Hill Hydropathic*. Vis. Phys., Dr. John Adam. Access—Forres station, 1 mile; Inverness, 24 miles.

Grange - over - Sands. — *Hazelwood Hydropathic*. Physicians, Richard Lowther, M.D., and Owen Gwatkin, M.R.C.S. Access—Carnforth, L. & N.W.R., and thence by Furness Railway; Grange-over-Sands, $\frac{1}{4}$ mile.

Harrogate (Yorkshire). — *Harlow Manor Hydro*. Man., Mr. Fenn, Med. Supt., Dr. Dimmock.

The Cairn Hydropathic. Near Leeds and Bradford. Man., Mrs. Baker. Access—Harrogate, $\frac{1}{2}$ mile.

The Harrogate Hydropathic. Phys., Thos. Johnstone, M.D. Access—Harrogate station, $\frac{1}{2}$ mile.

Hexham (Northumberland). — *Tyne-dale Hydropathic*. Prop., F. G. Grant. Med. Supt., Dr. Stewart. Access—Hexham, 1 mile; Newcastle, 19 miles.

Ilfracombe. — *The Cliffe Hydro*. Med. Supt., Chas. Toller, M.D. Apply to the Secretary. Station 1 mile.

Ilkley (Yorkshire). — *Craiglands Hydropathic*. Props., Dobson Bros. Res. Med. Supt., Henry Dobson, M.D., C.M.

Ilkley Wells House Hydro-Hotel. Med. Supt., Thos. Scott, M.D. Manager, Mr. Ballardie. Access—Ilkley station, $\frac{1}{4}$ mile.

The Spa Hydropathic, near Leeds and Bradford. Manageress, Miss Pugsley. Med. Supt., T. Johnstone, M.D. Access—Ilkley, 3 minutes.

Troutbeck Hydro. Manageress, Miss Moorhouse.

Kilmacolm (Renfrewshire). — *Hydropathic*. Access—Greenock, 7 miles; Glasgow, 16 miles, G. & S.W.R.

Limpley Stoke (near Bath). — *West of England Hydropathic*. Res. Med. Supt., Gerard Carré, M.D. Access—Limpley Stoke station.

Lincoln. — *Northcote Hydro*., Woodhall Spa. Med. Supt., R. Cuffe, M.R.C.S.

Llandudno. — *Hydropathic and Winter Residence*. Med. Supt., James Craig, M.B. Access—Llandudno station, 5 minutes.

Malvern. — *The Malvern Hydropathic*. Res. Prop., J. C. Fergusson, M.D. Access—Great Malvern station, $\frac{1}{4}$ mile.

See also p. 785

Wyche-side Hydropathic. Res. Phys., Dr. Grindrod. Access—Malvern Wells station, G.W.R., $\frac{1}{4}$ mile; Great Malvern station, 2 miles.

Matlock. — *Matlock House Hydropathic*, Matlock. Physician, W. Moxon, M.D., J.P. Access—Matlock, M.R., $\frac{1}{4}$ mile.

Rockside Hydropathic, Matlock. Med. Supts., Drs. A. L'Estrange Orme and Marie Goodwin. Access—Matlock, $\frac{3}{4}$ mile.

See also p. 789

Royal Hotel and Baths, Matlock Bath, connected with the Natural Thermal Mineral Spring. Phys., W. C. Sharpe, M.D. Access—Matlock Bath station. See also p. 788

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Access—Matlock station, $\frac{1}{2}$ mile; omnibus.

See also p. 784

Melrose. — *Waverley Hydropathic*. Con. Phys., Drs. Calvert and Wade. Access—Melrose station, 1 mile.

See also p. 783

Moffat. — *The Moffat Hydropathic*. Man., Miss Gardner. Med. Supt., Dr. Huskie.

Peebles. — *Peebles Hydropathic and Hotel*. A German Bath in Scotland. All the latest Electrical Treatment, with every known variety of Baths. All the advantages of a Continental Bad with the comforts of a first-class modern hotel. Med. Off., Dr. Neu.

See also p. 787

Rhyl (North Wales). — *The Claremont Hydro-Hotel*. Manager, W. G. Story.

Rothsay. — *Glenburn Hydropathic*. Med. Supt., Dr. Marshall. Access—Wemyss Bay, $\frac{1}{2}$ hour's sail.

See also p. 786

Scarborough. — *Hydro*. Access—Scarborough. N.E.R., $\frac{1}{4}$ hour.

Shandon. — *Shandon Hydropathic*. Consulting Phys., Dr. Douglas Reid; Phys., Dr. Wm. R. Sewell. Access—N.B.R. and Steamer.

Skelmorlie. — *Wemyss Bay Hydropathic*. Med. Supt., Dr. W. C. Philp. Access—Wemyss Bay station, $\frac{1}{2}$ mile.

See also p. 790

Southport (Birkdale Park). — *Smedley Hydropathic*. Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations.

See also p. 791

Kenworthy's Limes Hydropathic,
 51, Bath Street. Phys., Drs. Ken-
 worthy and Wilshaw. Access—
 Chapel Street (L. & Y.), Lord St.
 (Cheshire Line) $\frac{1}{4}$ mile.

Sunnyside Hydropathic Compy.
 Man., J. Marshall. Access—South
 port stations, $\frac{1}{2}$ mile.

Tunbridge Wells.—*The Spa*. Access
 —Station, about $\frac{1}{2}$ mile; London,
 32 miles.

Ulverston and Barrow-in-Furness.
 —*Conishead Priory Hydropathic*.
 Med. Supt., Dr. Ashburner. Access
 Ulverston station.

Watford.—*The Hall*, Bushey. Man.
 Col. Coyne. Med. Supt., Dr. F.
 Smith. Access—L. & N.W.R.,
 1 mile.

Windermere.—*Windermere Hydro-
 pathic*. Access—Windermere, L.
 & N.W.R. 1 mile. Sec., W. Martin-
 dale.

NURSING INSTITUTIONS AND PRIVATE HOMES FOR INVALIDS.

NURSING INSTITUTIONS.

Bath.—*Lansdown Hospital Nursing
 Home and Private Nursing Institute*,
 Lansdown, apply the Matron.

See also p. 778

Bournemouth.—*Victoria Nurses' In-
 stitute and Home Hospital*, Cam-
 bridge Road. Matron, C. Forrest.
 Access—Bournemouth West stat.

See also pp. 769 and 773

Bristol.—*Royal Infirmary, Private
 Nurses, Massage and General Nurs-
 ing*. Matron, Miss A. B. Baillie.

See also p. 769

General Hospital. Matron, Miss
 S. Morris; Sec., Wm. Thwaites.

See also p. 769

Cheltenham.—*General Hospital
 Private Nursing Staff*. Matron,
 Miss G. Miller. See also p. 772

Devonport.—*Royal Albert Hospital
 Nursing Inst.* Matron, Miss Glover.

Fee charged, per week: Ordinary
 cases, £1 11s. 6d.; Infectious, Operation,
 and Hysterical, £2 2s.; Small Pox,
 £3 3s.; Massage, £2 2s., or 5s. per visit.
 Travelling expenses and laundry extra.

Edinburgh.—*Royal Scottish Nursing
 Inst.*, 69, Queen Street, and 14,
 Castle Street, Dumfries. Matron,
 Miss King.

Ordinary cases, 30 - weekly; Mental,
 Massage, Infectious, 42 -. Maternity,
 £8 8s. one month. Telegrams: "Matron,
 Edinburgh." Telephone 2228.

Leeds.—*Trained Nurses' Institution*,
 21, Hyde Terrace. Apply to the
 Superintendent. See also p. 773

London.—*Baker Street Association of
 Hospital Trained Nurses*, 15, Baker
 Street, W. Supt., Miss Masters.

See also p. 773

Male Nurses' Association, 23,
 York Place, Baker Street, W.
 Supt., Wm. Gutteridge.

See also p. 772

*Temperance Male Nurses' Co-
 operation, Ltd.*, 43, New Cavendish
 Street, W.; also at Manchester
 and Edinburgh. Sec., M. D. Gold.

See also p. xviii

Up-Country Nursing Association
 for Europeans in India. Hon.
 Sec., H. M. Birdwood, C.S.I.,
 LL.D., Dalkeith House, Cambridge
 Park, Twickenham.

Copies of Rules for Engagement of
 Nurses, and information regarding work,
 can be obtained from Mrs. Sheppard,
 68, Regent's Park Road, Primrose Hill,
 London, N.W.

*Wigmore Nurses' Co-operation
 and Home for Paying Patients*, 59,
 Weymouth Street, W.

See also p. 772

Sunderland.—*Nursing Inst. and
 Home for Trained Nurses*. Matron,
 Miss C. Aldis.

Thoroughly reliable Nurses supplied
 for Medical, Surgical, Mental, and
 Maternity cases.

Taunton.—*Taunton and Somerset
 Hospital*. Matron, K. S. Bulteel.
 National Telephone No. 3. Telegrams
 "Nurses, Taunton."

PRIVATE HOMES FOR INVALIDS.

Bournemouth.—*St. Luke's Homes* for Epileptic Churchwomen, 36, Parkwood Road; also at Carisbrooke, Isle of Wight. *See also p. 774*

Victoria Nursing Institute and Home, Cambridge Road (for paying patients). Apply the Matron. *See also pp. 769 and 773*

Buxton.—*Corbar Tower*, Dietetic and Medical Home. Apply Mrs. Owen. Access—Station, Pump Room and Baths, 10 minutes' walk.

See also p. 762

Chilcompton (near Bath).—*Downside Lodge* (for ladies of weak intellect). Med. Supt., Alex. Waugh, M.D. Access—Chilcompton, about $\frac{1}{4}$ mile.

Derby. — *Clovelly Private Nursing Home*, Kedleston Road (medical, surgical, and accouchement cases). Apply to Miss Martin.

See also p. 769

Hadlow Down, Buxted (Sussex).—*South Beacon* (for the care and

treatment of gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harmer. Access—Buxted, 3 miles; Mayfield, 4 miles; Heathfield 4 miles.

See also p. 779

Jedburgh.—*Abbey Green*. Res. Prop., Wm. Blair, M.D. Access—N.B.R., Jedburgh. Tel. No. 3.

See also p. 773

London.—*St. Thomas's Home*, St. Thomas's Hospital, Westminster Bridge. Apply, Sydney Phillips, B.A., St. Thomas's Hospital, S.E. Access—Waterloo, 5 minutes.

See also p. 778

Ryde (Isle of Wight).—*Rays*, Strand. Home for Rest after illness or operation.

See also p. 779

Stanmore, Middlesex. — SCARLET FEVER Convalescent Home (*The Mary Wardell*). Vis. Phys., J. D. Thomas, M.D. Hon. Sec., Miss M. Wardell. Access—Stanmore (L. & N.W.R.), 2 mile. *See also p. 778*

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In order to provide for the granting of those Special Certificates of Proficiency in Vaccination which are required to be part of the Medical Qualification for entering into contracts for the performance of Public Vaccination, or for acting as deputy to a Contractor, the following arrangements are made:—

(1.) The Vaccination Stations enumerated in the subjoined list are open, under certain specified conditions, for the purposes of Teaching and Examination;

(2.) The Vaccinators officiating at these Stations are authorized to give the required Certificates of Proficiency in Vaccination to persons whom they have sufficiently instructed therein; and

(3.) The Vaccinators whose names in the subjoined list are printed in *italic letters* are also authorized to give such Certificates, after satisfactory examination, to persons whom they have not themselves instructed.

Cities and Towns having Educational Vaccination Stations.	Places used as Educational Vaccination Stations.	Vaccinators authorized to give Certificates of Proficiency in Vaccination.	Days and Hours of Attendance of the Vaccinators at Stations where periodic Courses of Instruction are given (a).
London	Westminster Hospital	A. E. Cope, M.D., (S.W.)	Thursday; 11
	St. Thomas's Hospital	25, Bessborough Gardens.	Tuesday; 10.30
	Tolmers Square Institute.	J. Loane, M.R.C.P.,	Monday, Wed.; 1
	Drummond St., N.W.	13, Great Alie Street, E.	Wednesday; 11
	Eastern Disp., Leman St.	E. C. Greenwood, L.R.C.P.,	Friday; 3
London	Christ Church Mission Hall, Shroton St., Marylebone	19, St. John's Wood Park, N.W.	
	St. Olave's and St. John's Institute, Tooley St., S.E.	V. A. Jaynes, M.R.C.S.,	Wednesday; 3
Birmingham	New Hospital for Women, 144, Euston Road, N.W.	Miss M. Thorne, M.D.,	Friday; 9
	Priory Rooms, Upp. Priory	143, Harley Street, W.	
Bristol	St. Peter's Hospital, Bristol	E. Robinson, M.D.,	Monday; 1.30
Cambridge	Addenbrooke's Hospital	213, Bristol Rd., Edgbaston	Wednesday; 11
Cardiff	Roath Church Institute, Sun Street, Roath.	G. S. Page, L.R.C.P.,	Wednesday; 4
Leeds	Leeds General Infirmary	78, Old Market Street	
Liverpool	17, Mulgrave Street	Dr. F. Deighton,	Wednesday; 4
Manchester	St. Mary's Hosp., Whitworth Street West, Manchester	Hills Road	
Newcastle	The Dispensary, Nelson St.	Dr. H. A. Schönlberg, University College	Tuesday; 11
Sheffield	Jessop Hospital for Women	Dr. A. T. Bacon,	*
Aberdeen	The Public Dispensary	Westfield, Hyde Park Rd.	
Dundee	Royal Infirmary	Dr. N. E. Roberts,	Tuesday; 3
Edinburgh	Marshall Street Dispensary	17, Mulgrave Street	
	Livingstone Dispensary, 39, Cowgate	John Scott, M.D.,	*
	The Western Dispensary, Ponton Street	249, Upper Brook Street	
	The Royal Public Dispensary	F. Hawthorn, M.D.,	Wednesday; 3
Glasgow	The Royal Infirmary	6, Regent Terrace	*
Belfast	City of Belfast Union Infirm.	3, Clarkehouse Road	
Cork	Cork District Hospital	Dr. T. Fraser,	Wednesday; 2.30
Dublin	45, Upper Sackville Street	51, Elmbank Terrace	
Galway	The Dispensary	R. C. Buist, M.D.,	Monday; 2
		166, Nethergate	
		J. B. Buist, M.D.,	Tuesday; 3
		1, Clifton Terrace	Thursday; 3
		W. G. Robertson, M.D.,	
		26, Minto Street	
		Dr. H. H. Borland,	Monday; 12 (Women)
		571, Alexandra Parade,	Thursday; 12 (Men)
		Denistown	
		Dr. J. W. Nicol,	Monday; 12
		7, Kersland Terrace	
		Dr. J. McLiesh,	*
		91, Great Victoria Street	
		W. E. A. Cummins, M.D.,	*
		17, St. Patrick's Place	
		Dr. A. N. Montgomery,	Tuesday, Friday; 10
		45, Upper Sackville Street	
		Dr. M. J. McDonogh,	
		Flood Street	

(a.) Candidates for Certificates should communicate with the authorized Teacher to learn the dates of his or her regular courses of instruction. * Days and hours arranged each Session.

MEDICAL AND SCIENTIFIC SOCIETIES.

- Abernethian Society—St. Bartholomew's Hospital, E.C.
 Æsculapian Society—Secretary, 346, Kingsland Road, N.E.
 Anatomical Society of Great Britain and Ireland—Secretary, Charing Cross Hospital, W.C.
 Anthropological Institute of Great Britain & Ireland—3, Hanover Square, W. Association for the Advancement of Medicine by Research—Secretary, 135, Harley Street, W.
 Association of Registered Medical Women—Sec., 11, Brunswick Square, W.C.
 British Association for the Advancement of Science—Burlington House, Piccadilly, W.
 British Balneological and Climatological Society—Sec., 11, Cavendish Place, W.
 British Dental Association—Secretary, 19, Hanover Square, W.
 British Electro-Therapeutic Society—Hon. Sec., 22, Queen Anne Street, W.
 British Gynæcological Society—20, Hanover Square, W.
 British Laryngological, Rhinological, and Otological Association—Sec., 11, Chandos Street, W.
 British Medical Association—429, Strand, W.C.
 British Medical Benevolent Fund—Sec., St. Bartholomew's Hospital, E.C.
 British Medical Temperance Association—Sec., Carlton House, Enfield.
 British Orthopædic Society—Hon. Sec., 20, Bedford Square, W.C.
 Chemical Society—Burlington House, Piccadilly, W.
 Clinical Society of London—20, Hanover Square, W.
 Dermatological Society of Great Britain and Ireland—11, Chandos Street, W.
 Dermatological Society of London—11, Chandos Street, W.
 Entomological Society of London—11, Chandos Street, W.
 Epidemiological Society—11, Chandos Street, W.
 Geological Society of London—Burlington House, Piccadilly, W.
 Harveian Society—Stafford Rooms, Tichborne Street, W.
 Hunterian Society, London Institution—23, Finsbury Circus, E.C.
 Imperial Cancer Research Fund—Examination Hall, Victoria Embankment, W.C.
 Incorporated Society of Medical Officers of Health—1, Upper Montague Street, W.C.
 King's College Medical Society—King's College Hospital, W.C.
 Laryngological Society of London—20, Hanover Square, W.
 Linnæan Society—Burlington House, Piccadilly, W.
 Lister Institute of Preventive Medicine, Chelsea Bridge Road, S.W.
 London Hospital Medical Society—Mile End, E.
 Medical Defence Union, Lim.—4, Trafalgar Square, W.C.
 Medical Officers of Schools Association—Secretary, 33, Harley Street, W.
 Medical Society of London—11, Chandos Street, W.
 Medico-Legal Society—22, Albemarle Street, W.
 Medico-Psychological Association—Sec., 11, Chandos Street, W.
 National Association for the Prevention of Consumption—20, Hanover Square, W.
 Neurological Society—Secretary, 33, Harley Street, W.
 New Sydenham Society—Secretary, 15, Cavendish Square, W.
 Obstetrical Society of London—20, Hanover Square, W.
 Odontological Society of Great Britain—20, Hanover Square, W.
 Ophthalmological Society of the United Kingdom—11, Chandos Street, W.
 Otological Society of the United Kingdom—Sec., 11, Chandos Street, W.
 Pathological Society of London—20, Hanover Square, W.
 Pharmaceutical Society of Great Britain—17, Bloomsbury Square, W.C.
 Physiological Society—Sec., C. S. Sherrington, M.D., Univ. Coll., Liverpool.
 Poor Law Medical Officers' Association—Sec., 243, Hackney Road, N.E.
 Psychical Research, Society for—20, Hanover Square, W.
 Röntgen Society—Hon. Sec., F. H. Low, M.B., 2, Henrietta Street, W.

- Royal Astronomical Society—Burlington House, Piccadilly, W.
 Royal Institute of Public Health—Russell Square, W.C.
 Royal Institution—21, Albemarle Street, Piccadilly, W.
 Royal Medical Benevolent College (Epsom). Sec., 37, Soho Square, W.
 Royal Medical and Chirurgical Society—20, Hanover Square, W.
 Royal Meteorological Society—70, Victoria Street, S.W.
 Royal Microscopical Society—20, Hanover Square, W.
 Royal Sanitary Institute of Great Britain, with which is incorporated the Parkes Museum—74A, Margaret Street, Regent Street, W.
 Royal Society of London—Burlington House, Piccadilly, W.
 Royal Statistical Society—9, Adelphi Terrace, W.C.
 Society of Anæsthetists—20, Hanover Square, W.
 Society for the Relief of Widows and Orphans of Medical Men—11, Chandos Street, W.
 Society for the Study of Diseases of Children—Hon. Sec., 33, Nottingham Place, W.
 Society for the Study of Inebriety—Hon. Sec., T. N. Kelynack, M.D., 120, Harley Street, W.
 Society of Members of the Royal College of Surgeons of England—Secretary, West Hill, Putney, S.W.
The Lancet Relief Fund—Secretary, *Lancet* Offices, 423, Strand, W.C.
 Therapeutical Society—Apothecaries' Hall, Blackfriars, E.C.
 Volunteer Medical Association—20, Hanover Square, W.
 West London Medico-Chirurgical Society—West London Hospital, Hammersmith, W.
 Zoological Society of London—3, Hanover Square, W.

MEDICAL AND SCIENTIFIC PERIODICALS, ETC.

- American Journal of Science—Monthly—43, Gerrard Street, W.
 Australasian Medical Gazette—Monthly 2/—Baillière, 8, Henrietta Street, W.C.
 Analyst—Monthly 2/—Simpkin & Co., 16, James Street, Haymarket, S.W.
 Anatomy and Physiology, Journal of—Quarterly, 6/—Griffin & Co., Exeter Street, W.C.
 Annals of Surgery—Monthly 2/—Cassell & Co., Lim., Ludgate Hill, E.C.
 Anthropological Journal—Half-yearly 10/—3, Hanover Square, W.
 Balneology and Climatology, &c., Journal of—Quarterly 2/—Bale, Sons & Danielsson, Lim., 83 91, Great Titchfield Street, W.
 Birmingham Medical Review—Monthly. 10 - per annum—Percival Jones, Lim., Edmund Street, Birmingham.
 Botanical Gazette (12 numbers yearly)—28, Essex Street, Strand, W.C.
 Botanical Magazine—Monthly, 3/6—6, Henrietta Street, W.C.
 Botany, Journal of—Monthly, 1/8—54, Hatton Garden, W.C.
 Brain—Quarterly 3/6—Macmillan & Co., Lim., St. Martin's Street, W.C.
 Bristol Medico-Chirurgical Journal—Quarterly 1/6—J. W. Arrowsmith, Bristol.
 British and Colonial Druggist—Weekly, 5/- per annum—44, Bishopsgate Street Without, E.C.
 British Gynæcological Journal—Quarterly 3/6—Bale, Sons & Danielsson, Lim., 83-91, Great Titchfield Street, W.
 British Homœopathic Society, Journal of—Quarterly, 2/6—Bale, Sons & Danielsson, 83 91, Great Titchfield Street, W.
 British Homœopathic Review—Monthly 1/—83 91, Great Titchfield St., W.
 British Medical Journal—Weekly 6d.—429, Strand, W.C.
 British Sanatoria Annual—2/6 yearly—Bale, Sons & Danielsson, Lim., 83-91, Great Titchfield Street, W.
 Burdett's Hospitals and Charities—Annually 6 —28-29, Southampton St., W.C.
 Caledonian Medical Journal—Quarterly 1/—A. Macdougall, Mitchell Street, Glasgow

- Chemical Industry, Journal of the Society of—Fortnightly. 30/- per annum—Westminster House, Great Smith Street, S.W.
- Chemical Society, Journal of the—Monthly—10, Paternoster Row, E.C.
- Chemist and Druggist—Weekly 4d., 10/- per ann.—42, Cannon Street, E.C.
- Chemists and Druggists, Register of—Annually 5/-—17, Bloomsbury Sq., W.C.
- Children's Diseases, British Journal of—Monthly 1/-—Adlard & Son, 22½, Bartholomew Close, E.C.
- Clinical Journal—Weekly 3d.—Adlard & Son, 22½, Bartholomew Close, E.C.
- Clinical Society, Transactions of the—Annually—38-41, Paternoster Row, E.C.
- Dental Annual and Directory—Annually 7/6—Baillière, 8, Henrietta Street, W.C.
- Dental Record—Monthly 6d.—6-10, Lexington Street, Golden Square, W.
- Dental Science, British Journal of—1st and 15th, 6d.—289 & 291, Regent Street, W.
- Dental Surgeon—Weekly 3d.—Baillière, 8, Henrietta Street, W.C.
- Dentistry, Australasian Journal of—Monthly 1/-—Baillière, 8, Henrietta Street, W.C.
- Dentists' Register—Annually 3/4—Spottiswoode & Co., Lim., 54, Gracechurch Street, E.C.
- Dermatology, British Journal of—Monthly 1/-—H. K. Lewis, 136, Gower Street, W.C.
- Dublin Journal of Medical Science—Monthly 2/-—Fannin & Co., Lim., Dublin.
- Edinburgh Medical Journal—Monthly 2/-—Young J. Pentland, Edinburgh
- Entomologist—Monthly 6d.—54, Hatton Garden, E.C.
- Entomologists' Monthly Magazine—Monthly 6d.—10, Paternoster Row, E.C.
- Epidemiological Society of London, Transactions of the—11, Chandos St., W.
- Folia Therapeutica—Quarterly 1/-—83 91, Great Titchfield Street, W.
- General Practitioner—Weekly 3d.—Moorgate Station Chambers, E.C.
- Geological Magazine—Monthly 1/6—37, Soho Square, W.
- Geological Society, Journal of—Quarterly 5/-—38-41, Paternoster Row, E.C.
- Geologists' Association's Proceedings—Bi-monthly 1/6—E. Stanford, 27, Cockspur Street, S.W.
- Glasgow Medical Journal—Monthly 2/-—A. Macdougall, Mitchell St., Glasgow.
- Good Health—Monthly 1d.—Simpkin & Co., Lim., 23, Paternoster Row, E.C.
- Guy's Hospital Gazette—Fortnightly 6d.—Guy's Hospital, S.E.
- Guy's Hospital Reports—Yearly 10/6—J. & A. Churchill, 7, Great Marlborough Street, W.
- Health—Weekly 1d.—358, Strand, W.C.
- Homœopathic World—Monthly 6d.—12, Warwick Lane, E.C.
- Hospital—Weekly 3d; 13/- per annum—28, 29, Southampton Street, W.C.
- Hygiene, Journal of—Quarterly, 21/- per volume—Fetter Lane, E.C.
- Inebriety, British Journal of—Quarterly 1/-—Baillière, 8, Henrietta Street, W.C.
- Knowledge and Scientific News—Monthly 6d.—27, Chancery Lane, W.C.
- Lancet—Weekly 7d.—423, Strand, W.C.
- Laryngology, Rhinology, and Otology, Journal of—Monthly 2/-—Adlard & Son, Bartholomew Close, E.C.
- Laryngoscope, The—Monthly 1/6—Baillière, 8, Henrietta Street, W.C.
- Linnæan Society, Journal of—Irregular, Price varies—Burlington House, Piccadilly, W.
- Linnæan Society, Transactions—Irregular, Price varies—Burlington House, Piccadilly, W.
- Liverpool Medico-Chirurgical Journal—Half-yearly, 2/6 each—H. K. Lewis, 136, Gower Street, W.C.
- Medical Annual—Annually 7/6—John Wright & Co., Bristol
- Medical Chronicle—Monthly 1/6—27, St. Ann Street, Manchester
- Medical Directory—Annually 14/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Medical Electrology and Radiology—Monthly 1/-—Siegle, Hill & Co., 2, Langham Place, W.

- Medical Homes for Private Patients—Annually 6d.—28, 29, Southampton Street, W.C.
- Medical Magazine—Monthly 1/-—62, King William Street, E.C.
- Medical Press and Circular—Weekly 5d.; 21/- per annum—Baillière, 8 Henrietta Street, W.C.
- Medical Register—Annually 10/6—54, Gracechurch Street, E.C.
- Medical Review—Monthly 1/6—66, Finsbury Pavement, E.C.
- Medical Review of Reviews—Monthly, 10/- per annum—H. Kimpton, 12, Furnival Street, E.C.
- Medical Student's Register—Annually 2/6—54, Gracechurch Street, E.C.
- Medical Temperance Review—Monthly 2d.—3 and 4, London House Yard, E.C.
- Medical Times and Hospital Gazette—Weekly 2d.—9, Adam Street, W.C.
- Mental Science, Journal of—Quarterly 5/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Meteorological Record—Quarterly 1/6—E. Stanford, 12-14, Long Acre, W.C.
- Meteorological Society, Journal of the Royal—Quarterly 5/-—E. Stanford, 12-14, Long Acre, W.C.
- Microscopical Science, Quarterly Journal of—10/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Middlesex Hospital Reports—Yearly 2/6—H. K. Lewis, 136, Gower St., W.C.
- Midland Medical Journal—Monthly 4d.—610, Coventry Road, Birmingham
- Midwives' Record—Monthly 2d.—W. Austin, 82, College Street, Chelsea, S.W.
- Midwives' Roll—Annual—54, Gracechurch Street, E.C.
- Mind—Quarterly 4/-—14, Henrietta Street, W.C.
- Naturalist—Monthly 6d.—The Museum, Hull
- Nature—Weekly 6d.—Macmillan & Co. Lim., St. Martin's Street, W.C.
- New Sydenham Society—Irregular; Subscription 21/-—H. K. Lewis, 136, Gower Street, W.C.
- New York Medical Journal—Weekly 6d.—66, West Broadway, New York
- New York Medical Record—Weekly 6d.—Wm. Wood & Co., 51, Fifth Avenue, New York
- Nursing, British Journal of—Weekly 1d.—11, Adam Street, W.C.
- Nursing Notes—Monthly 2d.—12, Buckingham Street, W.C.
- Nursing Times—Weekly 1d.—Macmillan & Co., Lim., St. Martin's Street, W.C.
- Obstetrics and Gynecology of the British Empire, Journal of—Monthly 2/6—Sherratt & Hughes, 60, Chandos Street, W.C.
- Odontological Society, Transactions of—Monthly, during Sessions, 2/6—83 to 89, Great Titchfield Street, W.
- Ophthalmic Hospital Reports, The Royal London—Yearly 5/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Ophthalmic Review—Monthly 1/6—60, Chandos Street, W.C.
- Ophthalmological Society's Transactions—Yearly 12/6—J. & A. Churchill, 7, Great Marlborough Street, W.
- Ophthalmoscope—Monthly 1/-—Pulman & Sons, 24, Thayer Street, W.
- Otological Society of the United Kingdom, Transactions of—Yearly 10/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Pathology and Bacteriology, Journal of—Quarterly, 21/- per volume—Y. J. Pentland, Edinburgh, and 21, Warwick Lane, E.C.
- Pharmaceutical Journal—Weekly 6d.—72, Great Russell Street, W.C.
- Pharmacy, Monthly Magazine of—Monthly 6d.—12 & 16, Coleman St., E.C.
- Physiology, Journal of—Quarterly, 21/- per volume—Fetter Lane, E.C.
- Polyclinic—Monthly 6d.—Bale, Sons & Danielsson, Lim., Great Titchfield Street, W.
- Practitioner—Monthly 2/-—The Practitioner, Lim., 149, Strand, W.C.
- Preventive Medicine, Journal of—Monthly 2/-—37, Russell Square, W.C.
- Progressive Medicine—Quarterly 12/-—129, Shaftesbury Avenue, W.C.
- Psychical Society, Proceedings of the—Occasionally—20, Hanover Square, W.
- Public Health—Monthly 1/6—1, Upper Montague Street, W.C.
- Quekett Microscopical Club, Journal of—Half-yearly 3/6—Williams & Norgate, 14, Henrietta Street, Covent Garden, W.C.

- R.A.M.C., Journal of the—Monthly 2/—Bale, Sons & Danielsson, Lim., 83-91, Great Titchfield Street, W.
- Registrar-General's Returns of Births, Deaths, and Marriages—Weekly and Quarterly—Wyman and Sons, Ltd., Fetter Lane, E.C.
- Röntgen Ray and Allied Phenomena, Archives of the—Monthly, 16/- per annum—129, Shaftesbury Avenue, W.C.
- Röntgen Society, Journal of—Quarterly 4/-—Smith & Ebbs, Northumberland Alley, E.C.
- Royal College of Surgeons' Calendar—Annually 1/-—Red Lion Court, Fleet Street, E.C.
- Royal Microscopical Society, Journal of the—Bi-Monthly 6/-—14, Henrietta Street, Covent Garden, W.C.
- Sanitary Journal—Monthly 1/-—143 and 144, Fleet Street, E.C.
- Sanitary Record—Weekly 3d.; 14/- per annum—5, Fetter Lane, E.C.
- Scientific American—Weekly, per annum 18/-—Kegan Paul & Co., 43, Gerrard Street, W.
- Scientific American Supplement—Weekly, per annum 25/-—Kegan Paul & Co., 43, Gerrard Street, W.
- Scottish Medical and Surgical Journal—Monthly 2/-—St. Giles Street, Edinburgh
- South African Medical Record—Fortnightly, 1/-—Baillière, 8, Henrietta Street, W.C.
- St. Bartholomew's Hospital Journal—Monthly 6d.—30, Holborn, E.C.
- St. George's Hospital Gazette—Monthly 6d.—Baillière, 8, Henrietta St., W.C.
- St. Mary's Hospital Gazette—Monthly, 5/- per annum—187, Edgware Rd., W.
- St. Thomas's Hospital Reports—Yearly 8 6—J. & A. Churchill, 7, Great Marlborough Street, W.
- Therapeutic Gazette—Monthly, 10/- per annum—H. K. Lewis, 136, Gower Street, W.C.
- Therapist, The—Monthly 6d.—1, 3, & 5, Marylebone Lane, W.
- Tropical Medicine, Journal of—Fortnightly 1/-—83 to 91, Great Titchfield Street, W.
- Tuberculosis—Quarterly 6d.—Adlard & Son, 22½, Bartholomew Close, E.C.
- Tuberculosis, British Journal of—Quarterly 1/6—Baillière, 8, Henrietta Street, W.C.
- Veterinary Journal—Monthly 1/-—Baillière, 8, Henrietta Street, W.C.
- Veterinary News—Weekly 1d.—Baillière, 8, Henrietta Street, W.C.
- Veterinary Surgeons, Register of the Royal College of—Yearly 3/6—Adlard & Son, Bartholomew Close, E.C.
- West London Medical Journal—Quarterly 1/-—Bale, Sons & Danielsson, Lim., Great Titchfield Street, W.
- Westminster Hospital Gazette—Monthly 6d.—Baillière, 8, Henrietta St., W.C.
- Westminster Hospital Reports—Yearly 6/-—H. J. Glaisher, 57, Wigmore Street, W.
- Year Book of Pharmacy—Annually 10/-—J. & A. Churchill, 7, Great Marlborough Street, W.
- Zoological Society of London, Proceedings—Yearly—3, Hanover Square, W.
- Zoologist—Monthly 1/-—54, Hatton Garden, E.C.

SELECTED MEDICAL TRADES DIRECTORY.

Antiseptic Dressing Manufacturers.

- Galen Manufacturing Co. Lim.,
Wilson St., New Cross Rd., S.E.
- Liverpool Lint Co., Netherfield Road
North, Liverpool
- Robinson & Sons, Lim., Chesterfield
- St. Dalmas & Co., A. de, Leicester

Bottle Makers.

- Isaacs, I. & Co., 106, Midland Road,
St. Pancras, N.W.
- Kilner Bros., Lim., 8, Great Northern
Goods Station, King's Cross, N.
- Youldon, E., Lim., Carter Street,
Maplin Street, E.

Dietetic Articles (Manufacturers of).

Abbott, Van & Sons, Baden Place,
Crosby Row, Borough, S.E.
Allen & Hanburys, Lim., Plough
Court, Lombard Street, E.C.
Back, George & Co., Devonshire
Square, London, E.C.
Bellis, T. K., Turtle Co., Lim., 15,
Bury Street, E.C.
Benger's Food, Lim., Otter Works,
Manchester
Blake, Sandford & Blake, 49, Dover
Street, W.
Bonthon & Co., 50-52, Glasshouse
Street, & 106, Regent Street, W.
Borthwick, F. L. & Co., 381, Kings-
land Road, N.E.
Bovril, Lim., 152-166, Old St., E.C.
Brand & Co., Lim., Mayfair, W.
Burrow, W. & J., Malvern
Cadbury Bros., Lim., Birmingham
Callard & Co., 74, Regent Street, W.
Carnrick & Co., Lim., 24 & 25,
Hart Street, W.C.
Foods Limited, Stockport
Frame Food Co., Lim., Southfields,
S.W.
Fry, J. S. & Sons, Lim., Bristol &
London
Horlick's Food Co., 34, Farringdon
Road, E.C.
Hugon & Co., Lim., Pendleton, Man-
chester
Ingram & Royle, Lim., 26, Upper
Thames Street, E.C.
King, Geo. & Co., Sycamore St., E.C.
Liebig's Extract of Meat Co., Lim.,
4, Lloyd's Avenue, E.C.
Maltine Manufacturing Co., Lim., 24
& 25, Hart Street, W.C.
Manhu Food Co., Lim., 23, Black-
stock Street, Liverpool
Mellin's Food Lim., Peckham, S.E.
Münich Lionbrew Co., 62, Holborn
Viaduct, E.C.
Neave, J. R. & Co., Fordingbridge
Nestlé, H., 6 & 8, Eastcheap, E.C.
Plasmon, International, Lim., 66a,
Farringdon Street, E.C., and 56,
Duke Street, W.
Ridge's Royal Food Mills, Boleyn
Road, London, N.
Savory & Moore, Ltd., 143, New
Bond Street, W.
Scott & Bowne, Lim., 10-11, Stone-
cutter Street, E.C.
Sumner, R. & Co., Lim., Lord Street,
Liverpool
Winter, R., City Arcades, Birmingham

Druggists (Principal Wholesale).

Allen & Hanburys, Lim., 37, Lom-
bard Street, E.C.
Baiss Bros. & Stevenson, Lim.,
Jewry Street, E.C.
Barclay & Sons, Lim., 95, Farringdon
Street, E.C.
Barron, Harveys & Co., 6, Giltspur
Street, E.C.
Battley & Watts, Cripplegate, E.C.
Bayer Co., Lim., 19, St. Dunstan's
Hill, E.C.
Bishop, Alfred, Lim., 48, Spelman
Street, N.E.
Blake, Sandford & Blake, 49, Dover
Street, W.
Brady & Martin, Lim., Newcastle
Buchner, Schacht & Co., 149, Hounds-
ditch, E.C.
Bullock, J. L. & Co., 3, Hanover
Street, W.
Burgoyne, Burbidges & Co. 12 & 16,
Coleman Street, E.C.
Burroughs, Wellcome & Co., Snow
Hill Buildings, E.C.
Christy, Tnos. & Co., Old Swan Lane,
E.C.
Corbyn, Stacey & Co., Lim., 300,
High Holborn, W.C.
Cox, Arthur H. & Co., Lim., Brighton
Dakin Bros., 82, Middlesex Street, E.
Denver Chemical Manufacturing Co.,
110, Cheapside, E.C.
Duncan, Flockhart & Co., 143,
Farringdon Road, E.C., &
Edinburgh
Evans, Gadd & Co., Lim., Exeter,
and Bristol
Evans Sons Lescher & Webb Lim.,
60, Bartholomew Close, and
Liverpool
Fassett & Johnson, 31 & 32, Snow
Hill, E.C.
Ferris & Co., Lim., Bristol
Fletcher, Fletcher & Co., Lim., 469,
Holloway Road, N.
Gale & Co., 15, Bouverie Street, E.C.
General Apothecaries' Co., Lim., 49,
Berners Street, W.
Giles, Schacht & Co., Clifton, Bristol
Hearon, Squire & Francis, Lim., 38
& 40, Southwark Street, S.E.
Hewlett, C. J. & Son, 35-42, Char-
lotte Street, E.C.
Howards & Sons, Stratford, E.
Jeyes' Sanitary Compounds Co., Lim.,
64, Cannon Street, E.C.
Knoll & Co., 27a, St. Mary-at-Hill, E.C.
Kühn, B. & Co., 16, Rood Lane, E.C.

Lloyd, T. Howard & Co., Leicester
 Lorimer & Co., Lim., Britannia Row,
 Islington, N.
 Macfarlan, J. F. & Co., Edinburgh,
 and 9 & 11, Moor Lane, E.C.
 Martindale, W., 10, New Cavendish
 Street, W.
 Midgley, Charles, Lim., 17, St. Ann's
 Square, Manchester
 Morson, T. & Son, 14, Elm Street,
 Gray's Inn Road, W.C.
 Newbery, F. & Sons, Lim., Charter-
 house Square, E.C.
 Oppenheimer, Son & Co., Lim., 179,
 Queen Victoria Street, E.C.
 Parke, Davis & Co., 111, Queen
 Victoria Street, E.C.
 Potter & Clarke, Artillery Lane, E.
 Potter, Samuel, 7, Fowkes Buildings,
 Great Tower Street, E.C.
 Quibell Bros., Lim., Newark.
 Raimes & Co., York
 Reitmeyer & Co., 63, Crutched Friars,
 E.C.
 Reynolds & Branson, Lim., 13,
 Briggate, Leeds
 Richards, J. M. & Sons, Lim., 46,
 Holborn Viaduct, E.C.
 Rogers, F. A., 327, Oxford Street, W.
 Saccharin Corporation, Lim., 165,
 Queen Victoria Street, E.C.
 Salamon & Co., Lim., Rainham
 Sanatogen Co., 83, Upper Thames
 Street, E.C.
 Smith, T. & H., Lim., 21, Duke St.,
 Edinburgh; and 22 City Rd., E.C.
 Southall Bros. & Barclay, Lim.,
 Birmingham
 Squire & Sons, 413, Oxford Street, W.
 Sumner, R. & Co., Lim., 50A, Lord
 Street, Liverpool
 Symes & Co., Lim., Liverpool
 Turner, Joseph & Co., Lim., Queens-
 ferry, Flintshire
 Willows, Francis, Butler & Thompson,
 Lim., 40, Aldersgate Street, E.C.
 Woolley, Jas., Sons & Co., Lim.,
 Manchester
 Wright, Layman & Unney, Lim.,
 48, Southwark Street, S.E.
 Wyleys, Lim., Coventry
 Zimmermann, A. & M., 3, Lloyd's
 Avenue, E.C.
 Zimmermann, Chas. & Co., 9 & 10,
 St. Mary-at-Hill, E.C.

Embalmers.

Dottridge Bros., Lim., East Road,
 City Road, N.
 Pearse (Messrs.), 75, Warwick Square,
 S.W.

Medical Transfer Agencies.

Scholastic, Clerical & Medical, Assoc.,
 Lim., 22, Craven Street, W.C.

Opticians.

Curry & Paxton, 195 199, Great
 Portland Street, W.
 Davidson, F. & Co., 140, Great
 Portland Street, W.
 Newton & Co., 3, Fleet Street, E.C.,
 & 471, Hornsey Road, N.
 Priest & Ashmore, Sheffield
 Ross, Lim., 111, New Bond Street, W.
 Watson, W., & Sons, 313, High
 Holborn, W.C.

Printers.

Morrison & Gibb, Lim., Edinburgh
 Wright, John & Co., Stone Bridge,
 Bristol

Publishers and Booksellers (Medical).

Adlard & Son, Bartholomew Close,
 E.C.
 Appleton, Sidney, 25, Bedford Street,
 W.C.
 Arnold, Edwd., 41 & 43, Maddox St.,
 W.
 Baillière, Tindall & Cox, 8, Henrietta
 Street, W.C.
 Bale, J. Sons & Danielsson, Lim., 83-
 91, Great Titchfield Street, W.
 Cassell & Co., Lim., Ludgate Hill,
 E.C. (and Printers).
 Churchill, J. & A., 7, Great Marl-
 borough Street, W.
 Constable, A. & Co., Lim., 16, James
 Street, Haymarket, S.W.
 Cornish Bros., Lim., New Street,
 Birmingham
 Fannin & Co., Lim., Grafton Street
 Dublin
 Glaisher, Henry J., 57, Wignore
 Street, W.
 Green, Wm. & Sons, Edinburgh, and
 12, Norfolk Street, W.C.
 Griffin, C. & Co., Lim., 12, Exeter
 Street, Strand, W.C.
 Hirschfeld Bros., Lim., 13, Farnival
 Street, E.C.
 Kimpton, Hy., 13, Farnival Street,
 E.C.
 Lewis, H. K., 136, Gower Street, W.C.
 Lippincott, J. B. Co., 5, Henrietta
 Street, W.C.
 Livingstone, E. & S., Teviot Place,
 Edinburgh
 Longmans, Green & Co., 39, Pater-
 noster Row, E.C.

Maclehoose, J. & Sons, 61, St. Vincent Street, Glasgow
 Macmillan & Co., Lim., St. Martin's Street, W.C.
 Medical Publishing Co., Lim., 22½, Bartholomew Close, E.C.
 Murray, John, Albemarle Street, W.
 Paul (Kegan), Trench, Trübner & Co., Lim., 43, Gerrard Street, W.
 Pentland, Young J., 21, Warwick Lane, E.C., and 11, Teviot Place, Edinburgh
 Rebman, Limited, 129, Shaftesbury Avenue, W.C.
 Renshaw, Henry, 356, Strand, W.C.
 Saunders, W. B. & Co., 9, Henrietta Street, W.C.
 Scientific Press Lim., 28 and 29, Southampton Street, W.C.
 Simpkin, Marshall, Hamilton, Kent & Co., Lim., Stationers' Hall Court and Paternoster Row, E.C.
 Smith, Elder & Co. 15, Waterloo Place, S.W.
 Thacker, W. & Co., 2, Creed Lane, E.C.
 Whittaker & Co., White Hart Street, Paternoster Square, E.C.
 Wright, John & Co. Stone Bridge, Bristol (and Printers)

Surgical Instrument and Appliance Manufacturers.

Allen & Hanburys, Lim., 48, Wigmore Street, W.
 Arnold & Sons, 42, Feaumont Street, W., and West Smithfield, E.C.
 Bailey, W. H. & Son, 38, Oxford Street, W.
 Brady & Martin, Lim., Newcastle
 Carter, Messrs., 6A, New Cavendish Street, W.
 Cocking, J. T., Plymouth
 Coles, William & Co., 5, Sackville St., Piccadilly, W.
 Cox, Alfred & Sons, 120, New Bond Street, W.
 Cox, Harry W., Lim., 1a, Rosebery Avenue, and 15-21, Laystall St., E.C. (Electrical)
 Coxeter & Son, 30-32, Seaton Street, N.W.
 Critchley, J. & Sons, 18, Great George Street, Liverpool
 Defries, J. & Sons, Lim., 146 & 147, Houndsditch, E.C.
 Dinneford & Co., 180, New Bond Street, W.
 Domen Belts Co., 456, Strand, W.C.

Down Bros., Lim., 21, St. Thomas's Street, S.E.
 Equipoise Couch Co., Ashford, Kent
 Ernst, F. Gustav, 80, Charlotte St., Fitzroy Square, W.
 Evans & Wormull, 31, Stamford Street, S.E.
 Fannin & Co., Lim., Grafton Street, Dublin
 Ferris & Co., Lim., Bristol
 Formalin Hygienic Co., Lim., 3, Lloyd's Avenue, E.C.
 Gale, Geo. & Sons, Lim., Birmingham
 Gardner, J. & Son, 32, Forrest Road, Edinburgh
 Gem Supplies Co., Lim., 121, Newgate Street, E.C.
 Grossmith, W. R., 110, Strand, W.C.
 Hancock, Edwin & Co., 32, Westgate Street, Bath
 Hawksley, T., 357, Oxford Street, W.
 Haywood, J. H., Castle Gate, Nottingham
 Hills & Co., 46, Newcomen Street, Boro', S.E.
 Holland & Son, 46, South Audley Street, W.
 Hooper & Co., 7, Pall Mall East, S.W.
 Huxley, E. & Son, 13, Old Cavendish Street, W.
 Jacobson, Richard, 11, Water Lane, E.C.
 Kamm, L. & Co., 27, Powell Street, Goswell Road, E.C.
 Krohne & Sesemann, 37, Duke Street, Manchester Square, W.
 Lynch & Co., Lim., Silver Street, E.C.
 Maw, S., Son & Sons, 7 to 12, Aldersgate Street, E.C.
 Mayer & Meltzer, 71, Great Portland Street, W.
 Montague, J. H., 69, New Bond Street, W.
 Mottershead & Co., 7, Exchange St., Manchester (Electrical)
 Newton & Co., 3, Fleet Street, E.C., and 471, Hornsey Road, N. (Electrical)
 O'Connor Extension Co., 2 Bloomsbury Street, W.C.
 Reynolds & Branson, Lim., 13, Briggate, Leeds
 Rogers, F. A., 327, Oxford Street, W
 Schramm, K. R. & Co., 116, Albany Street, Regent's Park, N.W.
 Satham, H. & Co., Corporation St., Manchester
 Stevens, J. C., 21 & 23, Marylebone Lane, W.

Sumner, R. & Co., Lim., Lord Street,
Liverpool

Weiss, J. & Son, Lim., 287, Oxford
Street, W.

White's Moc-main Patent Lever
Truss Co., Lim., 98, Shaftesbury
Avenue, W.

Young, Archibald & Son, 57-61,
Forrest Road, Edinburgh

Thermometer Manufacturers.

Hicks, J. J., 8-10, Hatton Garden,
E.C.

Zeal, G. H. 82, Turnmill Street, E.C.

Vaccine Lymph.

Lymph is supplied, free of charge,
on application to National Vaccine
Establishment, St. Stephen's House,
Cannon Row, Westminster, S.W.

Arents, E. (Dr. Doucet's), 48, Surrey
Square, Old Kent Road, S.E.

Association for the Supply of pure
Vaccine Lymph, 14a, Great
Marlborough Street, W.

Birmingham Calf Lymph Establish-
ment, 204, Victoria Road, Aston

Fannin & Co., Lim., Dublin

Faulkner's Vaccine Institution, 16,
Endell St., Bloomsbury, W.C.

Ferris & Co., Lim., Bristol

Hime, Dr., Bradford, Yorks.

Jenner Institute for Calf Lymph, 73,
Church Road, S.W.

Renner's (Dr.) Establishment, 75,
Upper Gloucester Place, N.W.

Roberts & Co. (Dr. Chaumier's), 76,
New Bond Street, W.

Wyleys, Lim., Coventry.

NOTE BOOK.

It is easier to make a note of a thing than to remember *where* the note was made. The following pages are indexed under their respective headings, and any note can be immediately found when required.

NOTES.

Copy here any formula or fact you wish to keep for reference. (These pages are indexed under the word "Notes.")

Antiphlogistine.

NEW YORK: 57, Laight Street.

THE DENVER CHEMICAL MFG. CO.

LONDON: 110, Cheapside, E.C.

SYDNEY: Gibb's Chambers, 7, Moore St.

MONTREAL: 623, Lagauchetiere St.

ANTIPHLOGISTINE can be purchased from all reputable Retail Chemists in the United Kingdom, Australasia, Straits Settlements, South Africa, Canada and the other British Possessions. It is handled by practically all Wholesale Chemists in these Countries. It is also on sale in the leading Chemists' shops in Paris, Berlin, Nice, Rome and other Continental Cities. *See page xxxi.*

NOTES.

John Wright & Co., *Medical Publishers* Bristol,
and *Printers,*

Are always prepared to negotiate for the Publication of Medical, Scientific and other works in the best style, and upon advantageous terms. Being Medical Printers as well as Publishers, and in direct communication through the post with every Practitioner in the Kingdom, they are enabled to issue Works of this character with every advantage to their Clients.

NOTES.

GAUTIER FRÈRES' ESTABLISHED
FINE LIQUEUR BRANDY. 1755.

(20 YEARS OLD.)

See Advertisement, page liv.

NOTES.

An **THE "AVON" LIGHT CAR** *or*
Ideal **THE "AVON" TRIMOBILE**
 Is the Doctor's Car. Why?
Doctor's On account of their Reliability, Ease of Control, Low Cost
CAR. of Upkeep, and General Handiness, combined with low
 Petrol consumption—40 to 50 miles to the gallon.
 THE AVON MOTOR MFG. CO., KEYNSHAM, near BRISTOL.
 See full Illustrated Announcement on page xxxiii.

NOTES.

BISEDIA

See full announcement on page xxvii.

The Demon of Dyspepsia is baffled by the best of all remedies for Painful Indigestion, Nausea and Vomiting.

GILES, SCHACHT & CO., CLIFTON, BRISTOL.

ADDRESSES (*PRIVATE*).

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INVENTORS AND MAKERS—

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5, Sackville Street, Piccadilly, LONDON, W.

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Note whether Midwifery or Sick Nurses, their terms and private addresses.

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NURSES.

Note whether Midwifery or Sick Nurses, their terms and private addresses

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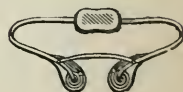
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INSTRUMENTS, APPLIANCES, OR MATERIALS WANTED.

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INSTRUMENTS, APPLIANCES, OR MATERIALS WANTED.

HORLICK'S MALTED MILK. A class by itself.
Stands alone. Always ready for use. No Cooking
required. Pasteurised and partially predigested.
Contains the enzymes of malt in active condition.

SEE PAGE
XLVI.

Samples—34, Farringdon Road, London, E.C.
and Slough, Bucks.



The Truth about Cocoa

is that there is
little to choose
between
Cadbury's
absolutely pure
Cocoa Essence
and milk — so

closely are they allied in composition.
For this reason



Cadbury's

COCOA

is full of nourishment in an easily-digested form.

Cadbury's is liquid food of the purest and
highest quality, made under ideal conditions
of cleanliness and pure surroundings in
the Garden Factory at Bournville.

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ESTABLISHED 1824.

Accumulated Funds exceed One and a Half Millions.

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INSURANCES. WORKMEN'S COMPENSATION. FIDELITY GUARANTEE.
BURGLARY. LIVE STOCK.

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Average rate of 64 British and Colonial Offices	...	2	1	2 %
"Yorkshire" rate...	...	1	17	3 %

ANNUITIES.

Specimen Rates for £100 Purchase Money.

	Males.						Females.					
	60			70			60			70		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Yorkshire ...	9	0	0	12	15	0	8	2	6	11	12	0
Average of other British Offices	8	16	2	12	12	3	7	18	4	11	8	2

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London Office:

Temporary Address (during rebuilding)—

INDEMNITY HOUSE, 1, OLD BROAD ST., E.C.

West End: 49, PALL MALL, S.W.

INDEX TO LIFE ASSURANCE OFFICES.

A, when Established ; B, C, D, Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50 ; E, Assurance and Annuity Funds, exclusive of Paid-up Capital.
M, Mutual Offices ; P, Proprietary Offices.

Those marked with an asterisk (*) in the E column have not sent revised figures for 1906.

TITLE, ETC., OF OFFICE.	A	B	C	D	E
Abstainers and General, Life and Accident, Carrs Lane, Birmingham. <i>Act. and Sec.</i> , R. A. Craig, A.I.A. P	1883	40/11	55/10	82/3	£ 287,182
Alliance, Fire and Life, Bartholomew Lane, E.C. <i>Gen. Man.</i> , Robert Lewis P	1824	48/9	64/5	90/9	7,604,214
Atlas, Fire and Life, 92, Cheapside, E.C. <i>Act.</i> , Robert Cross. <i>Gen. Man.</i> , Saml. J. Pipkin P	1808	49/3	63/7	88/8	1,861,150
British Equitable, Life, Fire, and Accident, 1, 2, 3, Queen Street Place, E.C. <i>Man.</i> , J. W. Fairey. Further particulars see page 718 P	1854	48/8	64/11	91/9	1,761,935
Britannic Assurance Co., Ltd. (formerly called British Workman's & General), Life and Endowments, Broad Street Corner, Birmingham. <i>Chairman</i> , F. T. Jefferson, J.P. <i>Sec.</i> , S. J. Port, F.C.I.S. Further particulars see page 720 P	1866	48/6	65/2	94/-	1,539,807
Caledonian, Fire and Life, 19, George Street, Edinburgh. <i>Gen. Man.</i> , Robert Chapman. London Offices, 82, King William Street, E.C., and 14, Waterloo Place, S.W. P	1805	48/9	64/6	88/6	2,388,343
City of Glasgow, Life, 30, Renfield Street, Glasgow. <i>Gen. Man.</i> , William S. Nicol. London Office, 12, King William St., E.C. <i>Lon. Man.</i> , J. D. Milne P	1838	48/9	64/6	89/10	2,831,980
Clergy Mutual, Life, 2 & 3, Sanctuary, Westminster. <i>Act. & Man.</i> , F. B. Wyatt. <i>Sec.</i> , W. N. Neale. Further particulars see page 719 M	1829	46/4	62/2	87/4	4,292,691
Clerical, Medical and General, Life, 15, St. James's Square, and 1, King William Street, E.C. <i>Act.</i> , W. J. H. Whittall P	1824	48/7	66/9	96/3	4,299,569
Colonial Mutual, Life and Annuity, 33, Poultry. <i>Man.</i> , Arthur E. Gibbs M	1873	47/4	63/2	89/9	2,920,210
Commercial Union, Fire, Life and Accident, 24, 25, and 26, Cornhill, E.C. <i>Act.</i> , H. C. Thiselton P	1861	49/5	64/2	87/8	3,004,438
Co-operative, Life, Fidelity, and Fire, Long Millgate, Manchester. <i>Sec.</i> , James Odgers. Further particulars see page 721 P	1867	45/8	61/5	88/4	75,871
Eagle, Life, 79, Pall Mall, S.W. <i>Gen. Man. and Sec.</i> , Geo. R. Jellicoe P	1807	50/8	65/5	91/4	2,392,400
Economic, Life, 6, New Bridge Street, Blackfriars. <i>Act. and Sec.</i> , G. Todd, M.A., F.I.A. M	1823	44/4	59/6	85/5	4,341,393
Edinburgh, Life, Endowments, and Annuities, 22, George Street, Edinburgh. <i>Man. and Act.</i> , A. Hewat, P.F.A., F.I.A. <i>Sec.</i> , T. M. Cardiner. London, 11, King William Street, E.C. <i>Sec.</i> , J. J. Bisgood P	1823	47/11	64/2	90/2	3,971,627
English and Scottish Law, Life, Annuity, Endowment, and Loan, 12, Waterloo Place, S.W. <i>Gen. Man.</i> , Albert G. Scott P	1839	47/1	62/8	87/9	2,525,289
Equitable Life Assurance Society, Mansion House Street, E.C. <i>Act. and Sec.</i> , G. J. Lidstone M	1762	53/5	67/11	90/7	4,846,731
Equity and Law, Life, 18, Lincoln's Inn Fields, W.C. <i>Act.</i> , W. P. Phelps, F.I.A., M.A. P	1844	48/10	64/6	90/9	4,265,624

A, when Established; B, C, D, Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50; E, Assurance and Annuity Funds, exclusive of Paid-up Capital. M, Mutual Offices; P, Proprietary Offices.

TITLE, ETC., OF OFFICE.	A	B	C	D	E
Friends' Provident, Life, Annuities, etc., Bradford, Yorkshire. <i>Sec.</i> , William H. Gregory. <i>Act.</i> , Alld. Moorhouse, F.I.A. M	1832	48/-	64/-	89/7	3,202,726
General, Life , 193, Cannon Street, E.C. <i>Man.</i> and <i>Sec.</i> , John Robert Freeman. Further particulars see page 720 P	1837	49/10	65/4	92/8	1,990,252
Gresham, Life, St. Mildred's House, E.C. <i>Man.</i> and <i>Sec.</i> , James H. Scott. P	1848	48/2	64/1	91/5	9,111,920
Guardian, Fire, Life, Accident, and Burglary, 11, Lombard St., E.C., & 21, Fleet St. <i>Sec.</i> , T. G. C. Browne. <i>Act.</i> , Ernest Woods P	1821	48/10	64/6	89/3	4,000,000
Law Life, 187, Fleet Street. <i>Man.</i> , E. H. Holt. <i>Act.</i> , J. E. Faulks. P	1823	49/4	64/10	91/-	4,304,707
Law Union and Crown, Life, Fire, Accident, Annuities, etc., 126, Chancery Lane. <i>Gen. Man.</i> , A. Mackay. P	1825	48/4	64/-	89/10	4,687,218
Legal and General, Life, to, Fleet Street, E.C. <i>Act.</i> and <i>Man.</i> , E. Colquhoun. P	1836	50/9	65/11	90/9	4,896,818
Life Association of Scotland, 82, Princes St., Edinburgh. <i>Man.</i> , John Turnbull Smith. <i>Sec.</i> , J. Sharp. London Office, 18, Bishopsgate Street Within, E.C. <i>Sec.</i> , J. C. Wardrop. P	1838	50/-	65/4	93/4	5,529,385
Liverpool and London and Globe, Fire, Life, and Annuities, 1, Dale Street, Liverpool. <i>Gen. Man.</i> and <i>Sec.</i> , John M. Dove. London Office, 1, Cornhill, E.C. P	1836	49/10	65/9	91/3	5,437,817
London and Lancashire, Life, 66 and 67, Cornhill, E.C. <i>Gen. Man.</i> , W. P. Clirehugh. <i>Act.</i> , W. R. Hopkins, F.I.A. <i>Sec.</i> , G. W. Mantering. P	1862	46/10	62/4	86/10	2,040,773
London Assurance Corporation, Fire, Life, and Marine, 7, Royal Exchange. <i>Man.</i> of Life Dept., James Clunes. <i>Act.</i> , A. G. Hemming. P	1720	49/6	64/11	91/5	2,320,282
London, Edinburgh and Glasgow, Life, Industrial, and Accidents, Farringdon Street, E.C. <i>Sec.</i> , T. V. Cowling. <i>Gen. Man.</i> , Thos. Neill. P	1881	48/7	64/9	93/4	742,942
London Life Association, Lim., 81, King William Street, E.C. <i>Act.</i> and <i>Man.</i> , C. D. Higham, F.I.A. M	1806	60/-	79/-	108/-	4,845,110
Marine and General Mutual, Life, and Marine, 14, Leadenhall Street, E.C. <i>Act.</i> and <i>Sec.</i> , S. Dav, F.I.A. M	1852	48/10	65/11	91/11	1,382,382
Metropolitan Life, 13, Moorgate St., E.C. <i>Act.</i> , H. J. Baker. <i>Sec.</i> , Bernard Woods M	1835	49/9	66/4	92/-	2,125,920
Mutual Life Assoc. of Australasia, 5, Lothbury, Bank, E.C. <i>Sec.</i> , Alfred Gilbert M	1869	48/-	65/-	93/-	1,959,375
National Mutual Life, 39, King Street, Cheapside. <i>Act.</i> and <i>Man.</i> , Geoffrey Marks, F.I.A. <i>Sec.</i> , H. J. Lockwood. <i>Asst. Act.</i> , C. R. V. Coutts, F.I.A. M	1830	48/4	63/7	89/6	2,720,441
National Mutual Life Association of Australasia, Ltd. , 5, Cheapside, E.C. <i>Man.</i> , John B. Gillison, F.I.A., F.F.A. Further particulars see page 721 M	1869	46/8	61/6	87/2	4,195,850
National Provident, 48, Gracechurch Street, E.C. <i>Act.</i> & <i>Sec.</i> , Lewis F. Hovil. M	1835	50/2	66/3	91 1	6,250,000
New York Life, Trafalgar Buildings, Trafalgar Square, London, W.C. <i>Gen. Man.</i> , C. Seton Lindsay. <i>Director Gen. of Agencies</i> , T. J. Pulling. <i>Sec.</i> , Wm. R. Collinson, F.C.I.S. M	1843	48/9	66/-	96/11	89,555,195
North British and Mercantile , Fire, Life, Burglary, and Annuities, 61, Threadneedle St., E.C., and 64, Princes St., Edinburgh. <i>Life Man.</i> and <i>Act.</i> , London, H. Cockburn. <i>Sec.</i> , R. Carmichael. Further particulars see page 717 P	1809	49/10	66/1	91/11	13,762,898

A, when Established ; B, C, D, Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50 ; E, Assurance and Annuity Funds, exclusive of Paid-up Capital.
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Northern Assurance, 1, Moorgate St., E.C. <i>Gen. Man.</i> , H. E. Wilson .. P	1836	49/-	64/8	90/10	4,553,242
Norwich Union, Life, Norwich. <i>Gen. Man.</i> and <i>Act.</i> , J. J. W. Deuchar. London Office, 50, Fleet Street, E.C. ..	1808	45/8	59/6	85/3	6,799,342
Pearl, Life, London Bridge, City, E.C. <i>Man.</i> , P. J. Foley .. P	1864	49/-	65/-	92/-	2,713,319
Pelican & British Empire, Life, 70, Lombard Street, 57, Charing Cross. <i>Gen. Man.</i> , G. H. Ryan, F.I.A. .. P	1797	48 11	64 7	90/8	5,107,657
Provident Clerks & General Mutual Life Assurance Association, 27 & 29, Moorgate St., E.C. <i>Sec.</i> , John E. Gwyer M	1840	46 4	62 8	92 2	2,360,560
Prudential (Ordinary), Life, Holborn Bars. <i>Sec.</i> , D. W. Stable. Further particulars see page 718 .. P	1848	49 6	65 11	91 11	32,605,714
Refuge, Life, Oxford St., Manchester. <i>Joint</i> <i>Mans.</i> , R. Wm. Green & John W. Proctor. London Office, 29, New Bridge Street P	1864	49 3	65 9	91/9	3,959,055
Rock, Life and Endowments, Educational and Life Annuities, Investment, etc., 15, New Bridge Street, E.C. <i>Act.</i> , G. S. Crisford, F.I.A. P	1806	42 5	55 11	81 2	2,231,933
Royal Exchange Assurance, Fire, Life, Annuities, etc., Royal Exchange, and 29, Pall Mall. <i>Act.</i> , H. E. Nightingale, F.I.A. Further particulars see page lxxv P	1720	49/-	64 9	90 2	4,709,745
Royal, Fire, Life, and Annuities, Royal Insurance Buildings, Liverpool. <i>Man.</i> , Chas. Alcock. London Offices, Lombard Street. <i>Sec.</i> , John H. Croft .. P	1845	49/9	64 1	88/3	9,135,960
Sceptre, Life and Endowments, 40, Finsbury Pavement, E.C. <i>Sec.</i> , W. E. Wright P	1864	48 8	64 8	90 6	1,050,113
Scottish Amicable, Life, St. Vincent Place, Glasgow. <i>Man.</i> , W. Hutton. <i>Sec.</i> , W. G. Spens M	1826	51 9	66 3	90 1	4,506,403
Scottish Equitable, Life, 28, St. Andrew Square, Edinburgh. <i>Man. & Act.</i> , G. M. Low. <i>Sec.</i> , J. J. McLauchlan. London Office, 19, King William St., E.C. <i>Sec.</i> , F. R. Leftwich .. M	1831	50/-	65 5	90 6	5,100,000
Scottish Life, Life, Accident and Annuities, 19, St. Andrew Square, Edinburgh. <i>Man.</i> , David Paulin, F.R.S.E. London Office, 13, Clements Lane, E.C. <i>Sec.</i> , George Struthers .. P	1881	49 5	64 6	90 5	1,028,395
Scottish Metropolitan, Life, 25, St. Andrew Square, Edinburgh. <i>Man.</i> , H. E. Marriott. London Office, 8, King Street, E.C. <i>Man.</i> , C. E. M. Hudson .. P	1876	40 8	54 7	79 7	621,402
Scottish Provident, Life & Annuities, 6, St. Andrew Square, Edinburgh. <i>Man.</i> , J. G. Watson. <i>Joint Secs.</i> , J. Lamb and R. T. Roothby. <i>Asst. Sec.</i> , C. W. Thomson. <i>Act.</i> , W. G. Walton. London Offices, 17, King William Street, E.C., and 17, Pall Mall, S.W. .. M	1837	42 4	56/6	83/2	13,500,000
Scottish Temperance, Life & Accident, 105, St. Vincent Street, Glasgow. <i>Manager</i> , Adam K. Rodger. London, 2, 3 & 4, Cheapside. <i>Man.</i> , W. A. Bowie. <i>Reduced</i> <i>Rates to Abstainers</i> .. P	1853	48 6	63/9	89/10	1,099,545
Scottish Union & National, Fire, Life, Pen- sions, Annuities, etc., 35, St. Andrew Sq., Edinburgh. <i>Gen. Man.</i> , J. A. Cook. <i>Sec.</i> , J. K. Macdonald. London Office, 3, King William Street, E.C. <i>Sec.</i> , William G. Glennie .. P	1824	50/6	63/6	91/-	4,373,745

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M, *Mutual Offices*; P, *Proprietary Offices*.

TITLE, ETC., OF OFFICE.	A	B	C	D	E
Scottish Widows' Fund, Life & Survivorship, 9, St. Andrew Square, Edinburgh. <i>Man. & Act.</i> , N. B. Gunn. <i>Sec.</i> , J. G. C. Cheyne. London Office, 28, Cornhill, E.C. <i>Sec.</i> , J. W. Miller. M	1815	51/9	66/3	90/7	18,200,000
Standard Life, 3, George Street, Edinburgh. <i>Man.</i> , Leonard W. Dickson. London Offices, 83, King William St., and 3, Pall Mall East. <i>Sec.</i> , J. H. W. Rolland. P	1825	48/11	64/5	89/-	11,258,453
Star, Life, Annuities, Endowments, 32, Moor-gate St., City. <i>Act. & Sec.</i> , H. G. Hobson. P	1843	48/9	64/11	90/6	6,347,479
Sun, Life, 63, Threadneedle Street, E.C. <i>Act.</i> , R. G. Salmon, F.I.A. <i>Sec. & Gen. Man.</i> , E. Linnell. P	1810	49/2	66/6	94/2	5,975,800
Sun Life of Canada, Life and Annuities, 93, Queen Victoria Street, E.C. <i>Man.</i> , Geo. E. Reid. P	1865	48/6	65/2	94/1	4,600,000
Union, Fire and Life, Cornhill, Charing Cross, and Baker Street. <i>Gen. Man. & Sec.</i> , J. Powell. <i>Act.</i> , L. K. Pagden. P	1714	48/9	64/6	90/10	3,492,601
United Kingdom Temp., etc., Life, 1, Adelaide Place, London Bridge. <i>Sec.</i> , Johnson Brooks. M	1840	48/10	64/11	90/6	8,300,000
University, Life, 25, Pall Mall, S.W. <i>Act. and Sec.</i> , R. Todhunter, M.A. P	1825	49/11	65/4	91/5	923,572
Victoria Mutual, Life and Endowment, Memorial Hall Buildings, Farringdon St. F.C. <i>Sec.</i> , Arthur J. Cook, A.I.A. M	1860	49/3	65/7	93/-	145,185
Wesleyan and General, Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. <i>Gen. Man.</i> , R. A. Hunt, F.S.S., A.I.A. London Office, 101, Finsbury Pavement, E.C. Further particulars see page 720. M	1841	48/1	65/8	93/10	891,676
Yorkshire, Fire and Life, St. Helen's Sq., York. London Office, 2, Bank Buildings, Princes Street. Further particulars see page 712. P	1824	49/1	64/9	91/7	*978,511

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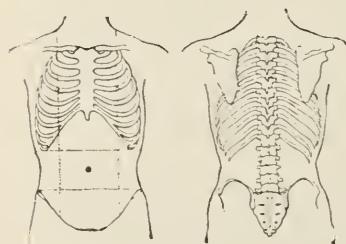
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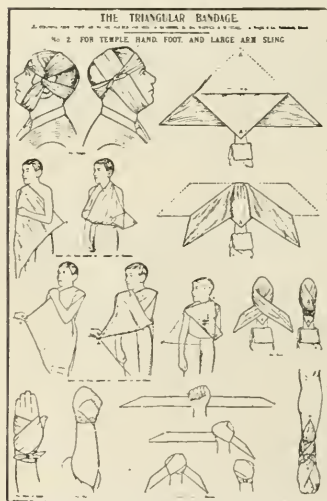
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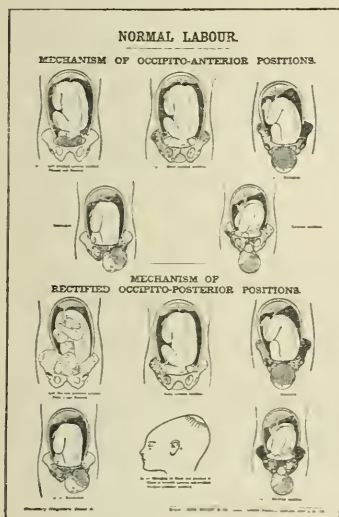
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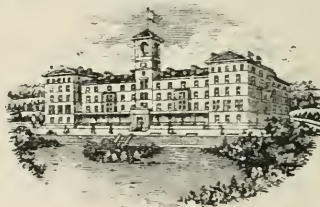
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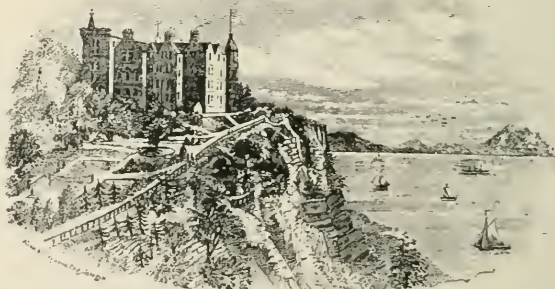
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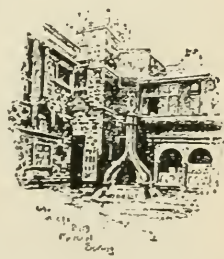
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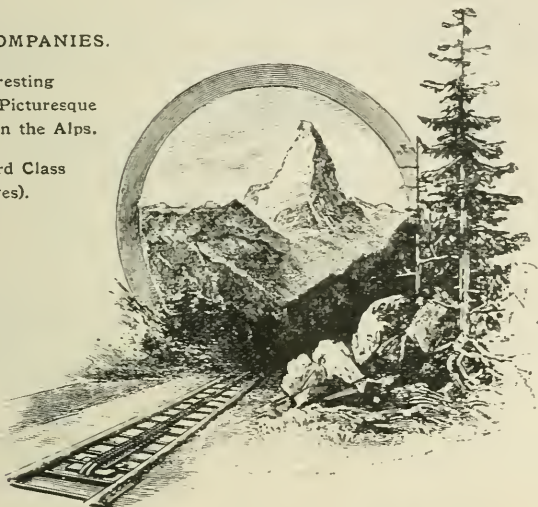
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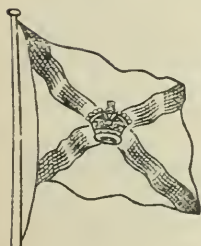
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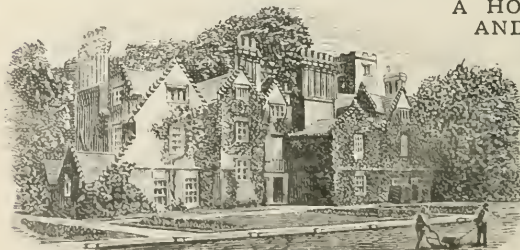
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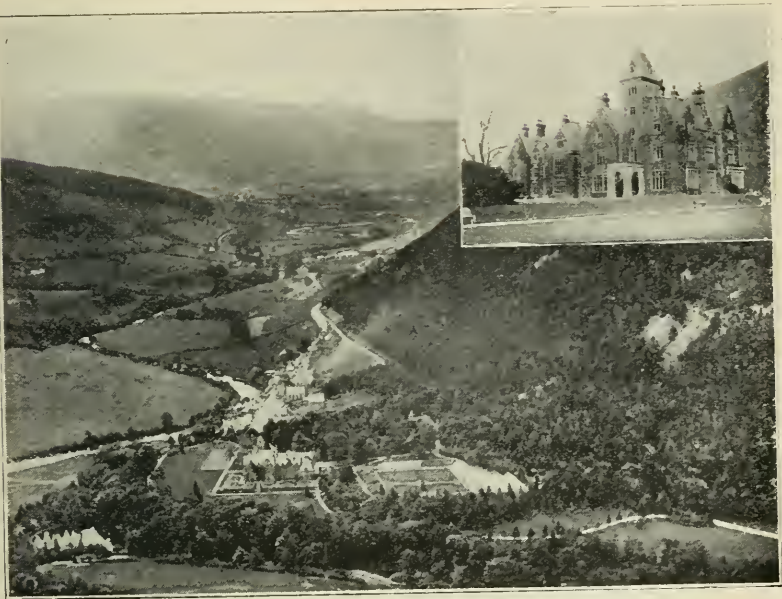
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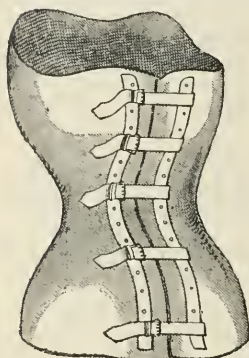
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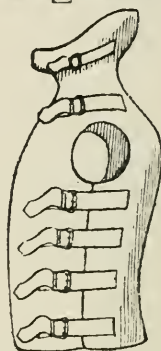
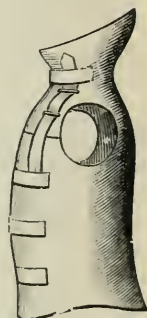
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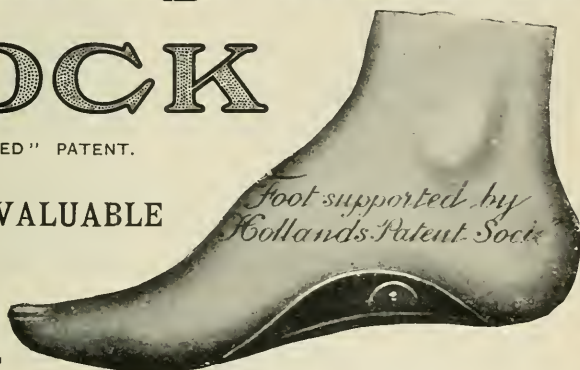
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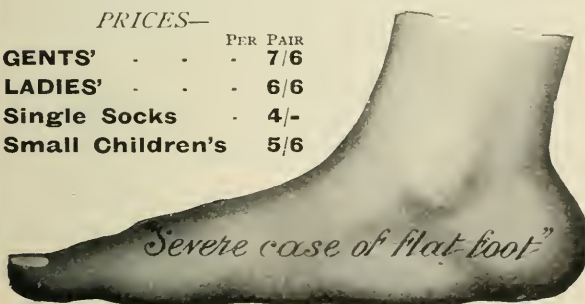
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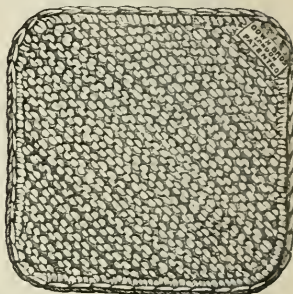
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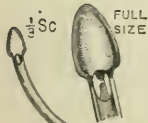
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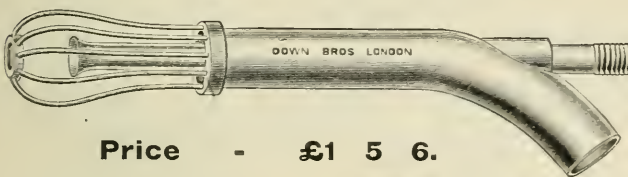


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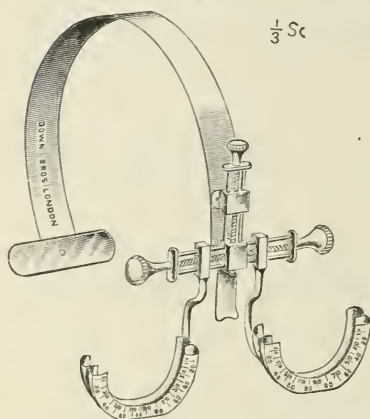


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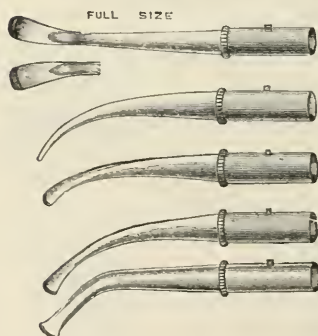
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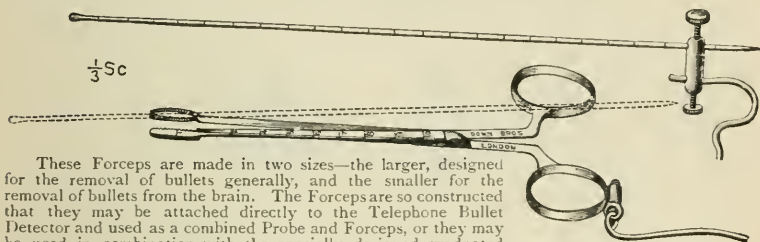
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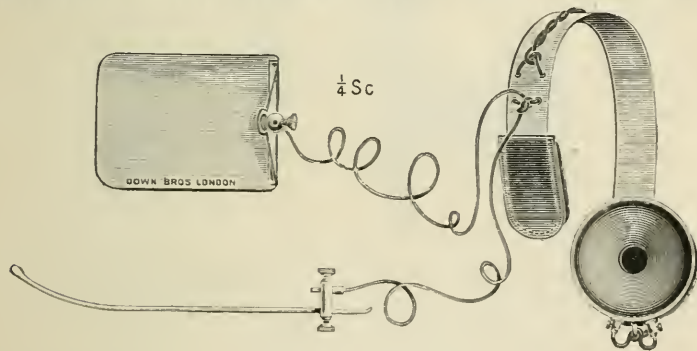
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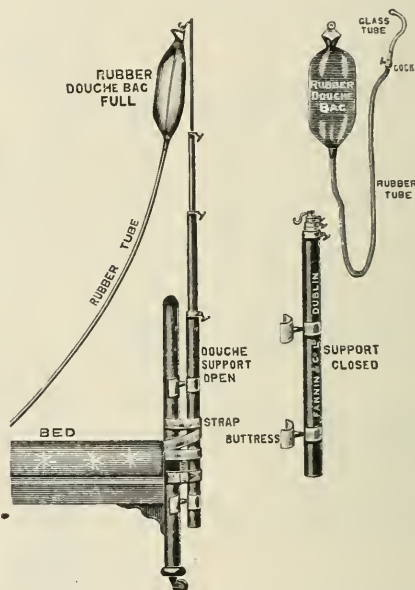
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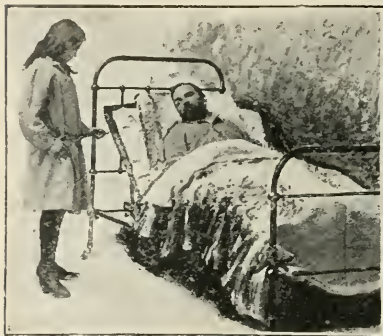
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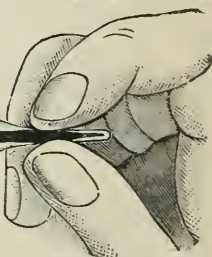
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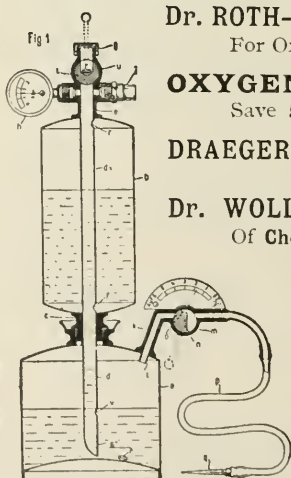
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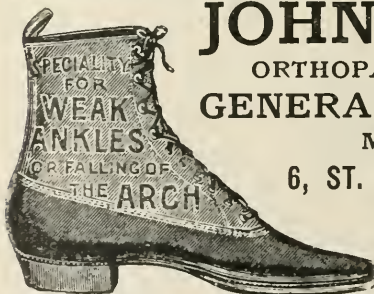


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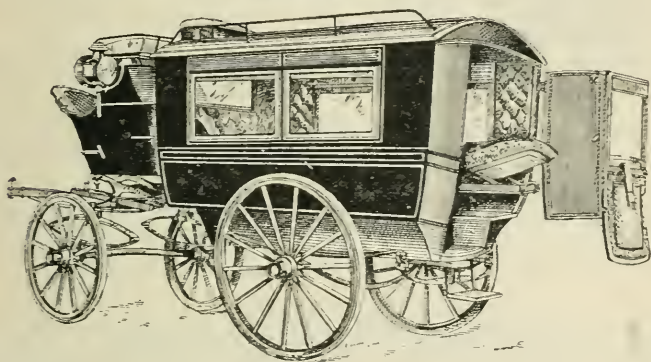
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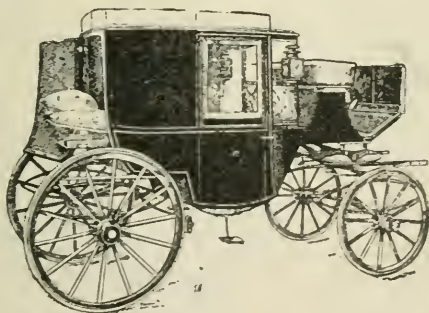
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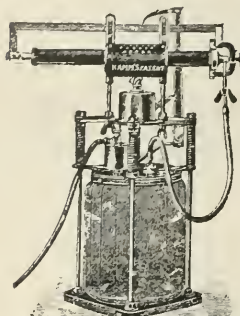
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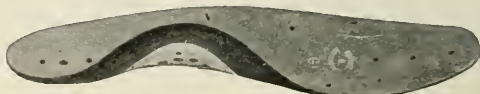
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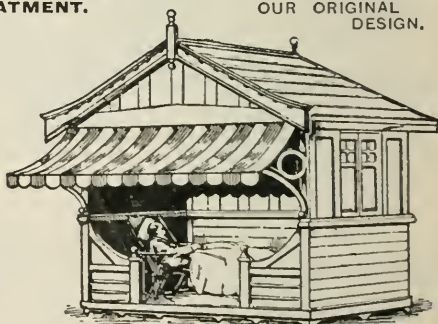
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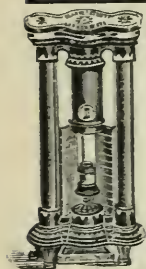
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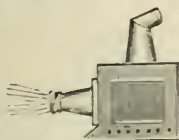
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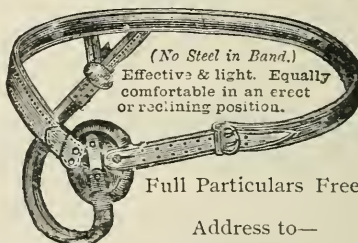
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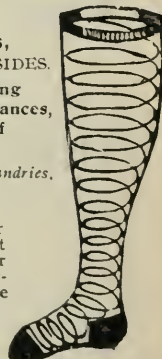
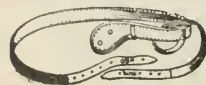
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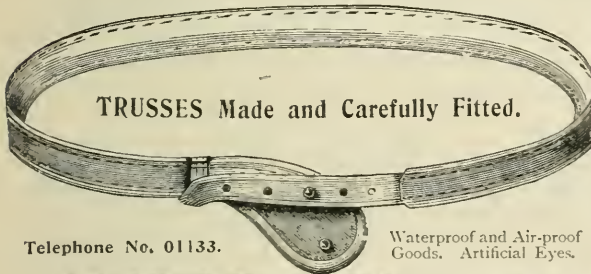
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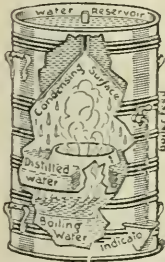
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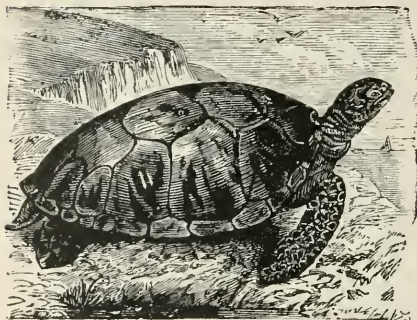
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“*THE GRAND PRIX*”
 at the PARIS EXHIBITION, 1900.

The *Lancet* of February 16th, 1895, gives a detailed Report of the Manufacture of this famous drink, which Report contains the following **Analysis** :—

Constituents.	English Beers		LÖWENBRÄU
	Mild. Per cent.	Bitter. Per cent.	BEER. Per cent.
Alcohol by weight	6·78	5·44	3·55
„ „ volume	8·45	6·78	4·45
Equal to proof spirit	14·81	11·89	7·80
Total malt extractives	6·74	5·42	7·09
Mineral matters	0·43	0·24	0·36
Albuminous matters	0·26	0·16	0·577
Maltose and dextrine	5·77	4·22	6·15

The **Analysis** of the mineral matter of the MÜNICH LÖWENBRÄU BEER furnished the following results (calculated on a hundred parts of the ash) :—

	Per cent.
Phosphoric acid (P_2O_5)	32·00
Potash (K_2O)	37·80
Silica	9·44
Other salts, chiefly carbonates and sulphates of lime, and magnesia	20·76

100·00

The ash consists, therefore, for all practical purposes, of the valuable dietetic agent **Phosphate of Potassium**.

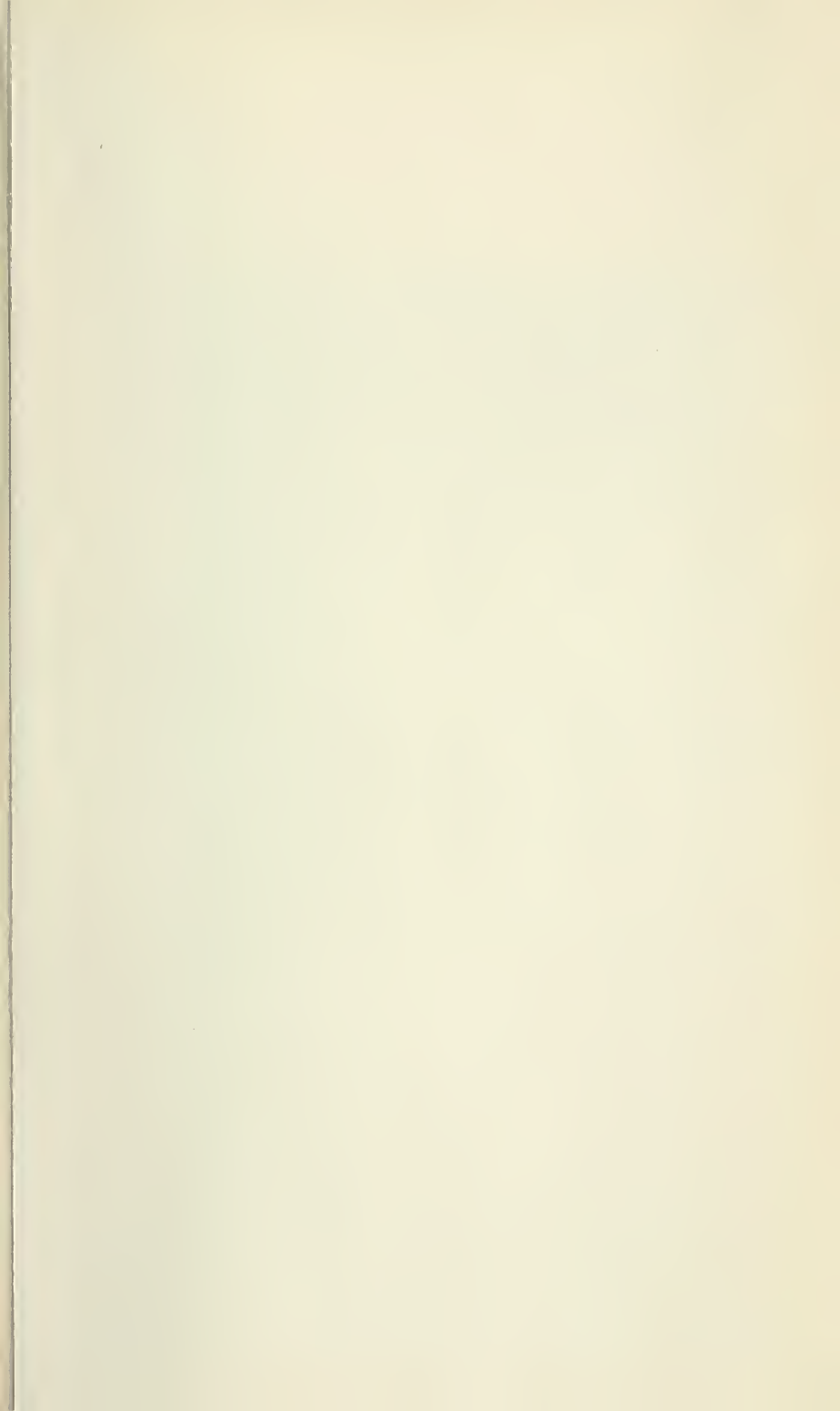
Altogether a genuine and wholesome drink.

N.B.—The flues of the Munich Malting kilns being arranged in such a way as to preclude the contact of smoke with Barley, **all danger of arsenic poisoning is thereby absolutely removed.**

For Prices and Sample Bottle (free of charge) as well as for

Book “**WHAT TO DRINK,**” apply to the—

Munich Lionbrew Company's London Offices :
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